REPORT RESUMES

ED 003 319 24

AN AUDIOVISUAL TEST FOR EVALUATING THE ABILITY TO RECOGNIZE PHONETIC ERRORS.

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REPORT NUMBER CRP-1983 PUB DATE 30 JUN 64
REPORT NUMBER RF-1602
EDRS PRICE MF-$0.18 HC-$5.00 125P.

DESCRIPTORS- *ARTICULATION (SPEECH), *HANDICAP DETECTION, *HANDICAPPED, HANDICAPPED CHILDREN, LANGUAGE HANDICAPS, AUDIOVISUAL INSTRUCTION, *AUDITORY VISUAL TESTS, AUDITION (PHYSIOLOGY), TESTS, *FILMS, INSTRUCTIONAL FILMS, SPEECH, SPEECH INSTRUCTION, SPEECH HANDICAPS, SPEECH IMPROVEMENT, PHONETICS, PROGRAM EVALUATION, COLUMBUS, OHIO

AN AUDIOVISUAL FILM WAS PRODUCED TO HELP RESEARCHERS AND CLINICIANS ESTABLISH THEIR RELIABILITY OF JUDGMENTS OF MISARTICULATIONS IN CHILDREN'S SPEECH. THE FINAL FILM SCRIPT WAS PREPARED AFTER A PRELIMINARY STUDY HAD BEEN EVALUATED BY PANELS OF BOTH TRAINED AND UNTRAINED LISTENERS. SIX CHILDREN, BETWEEN THE AGES OF 6 AND 13, WHOSE MISARTICULATION RANGED FROM MODERATE TO SEVERE RECORDED 23 WORDS (CONTAINING 43 CONSONANT SOUNDS) AS SINGLE WORDS, PHRASES AND TRIOS IN RANDOM ORDER TO GIVE A TOTAL OF 558 SOUNDS TO BE JUDGED FOR ACCURACY. TWO FORMS OF THE AUDIOVISUAL FILM WERE PRODUCED AND WERE EVALUATED BY THREE GROUPS OF JUDGES--50 CLINICIANS, 50 SENIORS, MAJORING IN SPEECH AND HEARING, AND 50 CLASSROOM TEACHERS. STATISTICAL EVALUATION OF THE DATA INDICATED THAT THE AUDIOVISUAL TEST WAS VALID, RELIABLE, AND EASY TO ADMINISTER. CLINICIANS AND GRADUATING SENIORS LARGELY AGREED BUT DIFFERED FROM TEACHERS IN IDENTIFYING MISARTICULATIONS. IDENTIFICATION OF MISARTICULATIONS IN ISOLATED WORDS WAS BETTER THAN IN PHRASES FOR JUDGES IN ALL GROUPS. THE AUDIOVISUAL METHOD WAS SUPERIOR TO AN AUDIO-ONLY METHOD FOR ALL GROUPS. (JC)

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one word

"AN AUDIO~~-~~VISUAL TEST FOR EVALUATING THE ABILITY TO RECOGNIZE PHONETIC ERRORS"

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Technical Report

RF Project 1602

Cooperative Research Project 1983

June 30, 1964

Prepared

for

U. S. Office of Education

Cooperative Research Branch

Department of Health, Education, and Welfare

ED 003319

ACKNOWLEDGMENTS

Ivan Paul Krafchick, Research Associate and graduate student at The Ohio State University, assisted in the project in many ways to achieve the final goals. He served principally in the selection of words for the film, the selection of the children to be filmed, and the presentation of stimuli to the children during the filming.

Dr. D. R. Whitney, Professor of Mathematics and Director of Statistical Laboratory, The Ohio State University, assisted in the statistical aspects of the study.

To all of the parents who gave consent for their children to participate as subjects in the film, and to the experienced clinicians, graduating senior majors, and the classroom teachers who so generously gave time to participate as judges in this study, we are sincerely grateful.

SUMMARY

The purpose of this study was to prepare an audiovisual film which would be valid and reliable for researchers and clinicians to use for establishing their reliability of judgments of misarticulations in the speech of children.

Two lists of 23 words were prepared with a total of 43 consonant sounds in each list. These lists were randomly arranged in six sets of isolated words, three sets of phrases, and three sets of "trios" of words. The final test consisted of 558 sounds in each form.

Six children with functional misarticulations were selected to serve as subjects for the film. Three groups of judges evaluated the films: 50 experienced clinicians, 50 graduating senior majors in speech and hearing, and 50 classroom teachers.

As a result of the statistical evaluation of the data, the following conclusions were made:

1. Experienced clinicians and graduating seniors acted approximately alike but differently from the classroom teachers in the identification of misarticulations.

2. Identification of misarticulations in isolated words was better than in phrases for judges in all three groups. Identification of misarticulations in "trios" was better than in phrases for experienced clinicians and graduating seniors. Although the 2 trained groups did not differentiate between isolated words and "trios", the classroom teachers did better with sounds in isolated words than in "trios."

SUMMARY (continued)

3. The accurate identification of misarticulations by the audiovisual method was significantly better than by audio (only) method for all three groups.

4. For identification of misarticulations in isolated words, the two films (alternate forms) were not significantly different. When all parts were considered, Film A was preferred.

5. The two trained groups identified correctly more misarticulations of the following sounds than did the classroom teachers: [s, l, θ , ð , f, hw, tʃ , z, ʃ , g, k, v, r].

It would appear from the results of this study that the audiovisual test is valid, reliable, and easy to administer.

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CHAPTER I

INTRODUCTION AND STATEMENT OF THE PROBLEM

The ASHA Committee on the Mid-Century White House Conference[1] estimated that there were 2,000,000 speech-handicapped school children in the United States. Trained public school speech clinicians classify approximately 80 per cent of the speech defectives undergoing speech therapy, in their school populations, as problems of defective articulation, according to Black,[2] MacLearie,[3] and Powers.[4] According to the results of a national survey,[5] 81 per cent of the children in the caseloads had articulatory problems.

If the children who technically constitute the largest category of handicaps in the public schools are to be helped effectively, a better understanding of the proficiency of speech and hearing clinicians and classroom teachers in their ability to identify misarticulations would appear necessary.

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[1] ASHA Committee on the Mid-Century White House Conference, "Speech Disorders and Speech Correction," Journal of Speech and Hearing Disorders, 17 (1952), pp. 129-137.

[2] Martha E. Black, "The Illinois Plan for Special Education of Exceptional Children--The Speech Defective." Circular Series "E", No. 12 Revised. (Springfield, Illinois: Issued by Vernon L. Nickell, Superintendent of Public Instruction, 1952).

[3] Elizabeth C. MacLearie, "The Ohio Plan for Children with Speech and Hearing Problems," State of Ohio Department of Public Instruction, Columbus, 1962.

[4] Margaret Hall Powers, "Functional Disorders of Articulation--Symptomatology and Etiology," Handbook of Speech Pathology, ed. Lee Edward Travis (New York: Appleton-Century-Crofts, Inc., 1957), p. 711.

[5] "Public School Speech and Hearing Services," Journal of Speech and Hearing Disorders, Monograph Supplement #8, July, 1961, p. 38.

Review of the Literature

Many research studies involving the identification of speech-sound errors and gross ratings of articulatory severity include some method for ascertaining the reliability of the judges. In others, no attempt is made to determine the reliability of the tester. This investigator did not know of any experiment which had attempted to standardize a test for measuring proficiency in the recognition of phonetic inaccuracies of speech.

Studies concerned with the individual's ability to identify misarticulations indicate conflicting results. Some infer that little training is needed while others indicate that inconsistencies exist even among judgments of the trained.

Several investigations have been made concerning differences between individuals with different levels of training in their ability to discriminate articulatory errors. Oyer[6], in evaluating the ability to discriminate articulatory errors, found that "there is no significant difference in speech error recognition ability between seniors in elementary education and seniors in speech and hearing therapy." He indicated that if abilities between the two groups remained constant, elementary teachers would be qualified to select children having speech deviations as well as individuals trained to provide speech therapy. Siegel[7] has reported that without training in the recognition of articulatory errors, inexperienced

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[6] Herbert J. Oyer, "Speech Error Recognition Ability," Journal of Speech and Hearing Disorders, 24 (1959), pp. 391-394.

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[7] Gerald M. Siegel, "Experienced and Inexperienced Articulation Examiners," Journal of Speech and Hearing Disorders, 27 (1962), pp. 28-35.

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examiners correlate with each other r = .92 and with experienced examiners r = .80 - .92. Siegel indicated that inexperienced examiners, such as classroom teachers, can be qualified to select children who are to receive speech therapy.

Studies by Goolsby[8] and Wilson,[9] using more precise and exacting

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[8] Lula Mae Goolsby, "Measurements of Distorted or Defective Speech Sounds of a Group of Children Having Articulatory Defects" (M.A. Thesis, The Ohio State University, 1955).

[9] Barbara J. Wilson, "An Objective Evaluation of an Original Twenty-Seven Word Picture Articulation Test Formulated to Examine Sixty-One Different Speech Sounds" (M.A. Thesis, The Ohio State University, 1960).

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criterion measures in testing the discrimination of articulatory errors, found that when more than one sound is evaluated at a time, differences between inexperienced and experienced examiners become apparent. As a result of her investigation, Goolsby reported ". . . this limited study indicated that a certain amount of training is necessary for one to diagnose an articulatory defect, since novice judges vary more and agree less among themselves than experts or judges in training."

Avant and Hutton,[10] screening the articulation of children in upper elementary grades, found that experienced examiners located more errors than those with less experience. Studying the misarticulations of cleft palate speakers, Byrne, Shelton, and Diedrich[11] found differences in percentages of agreement among judges for different sounds and for the same sounds in different positions. The authors concluded that "Research results in the area of articulation would be more comparable if a more standardized procedure of testing and more definitive standards of phonemic accuracy were adopted by members of the profession."

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[10] Velma Avant and Charles Hutton, "Passage for Speech Screening in Upper Elementary Grades," Journal of Speech and Hearing Disorders, 27 (1962), pp. 40-46.

The ability of teachers to refer children with defective articulation for speech therapy is largely based upon their ability to identify misarticulations. Lloyd and Ainsworth[12] have supported the theory that classroom teachers lack sufficient training in speech correction and are therefore unable to make adequate referrals to the speech therapist. Parks[13] and Parsons[14] also state in this regard that efforts of the classroom teacher to identify speech problems are hindered by the teacher's limited knowledge of speech correction and phonetics and that the recognition and identification of speech deviations require special training. Comparing identifications of individuals with speech deviations by speech specialists and second grade teachers, Diehl and Stinnett[15] found teachers identified severe articulatory defective with 81.6 per cent accuracy and mild articulatory defects with 42.17 per cent accuracy when 3,061 second-grade children representing 14 different counties were evaluated for speech by both teacher questionnaires and examinations by two trained speech clinicians. In a similar study, Kaplan[16] reported that teachers selected 31 per cent of the speech-defective population used in her study and diagnosed as defective 4 per cent to 8 per cent of the normal speaking population.

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[11] Margaret C. Byrne, Ralph L. Shelton, Jr., and William M. Diedrich, "Articulatory Skill, Physical Management, and Classification of Children with Cleft Palates," Journal of Speech and Hearing Disorders, 26 (1961), pp. 326-333.

[12] Gretchen Wright Lloyd and Stanley Ainsworth, 'The Classroom Teacher's Activities and Attitudes Relating to Speech Correction," Journal of Speech and Hearing Disorders, 19 (1954), pp. 244-249.

[13] Merle R. Parks, 'The Classroom Teacher and Speech Correction," Quarterly Journal of Speech, 28 (1942), pp. 471-477.

[14] Robert R. Parsons, "An Experiment in Speech Education in the Elementary Schools," Quarterly Journal of Speech, 31 (1945), pp. 217-222.

Zytkus[17] found that classroom teachers made more referrals of children for speech therapy, than they had previously, after participating in an intensive course in speech instruction.

There are also few studies which have been undertaken to investigate the differences between judgments made of speech deviations under audio as compared with audiovisual and visual conditions.

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[15] Charles F. Diehl and Charles D. Stinnett, "Efficiency of Teacher Referrals in A School Speech Testing Program," Journal of Speech and Hearing Disorders, 24 (1959), pp. 34-36.

[16] Joan Katz Kaplan, "The Reliability of the Selection of Speech Defectives by Public School Teachers" (M.A. Thesis, Brooklyn College, 1961).

[17] Marilyn Jacobs Zytkus, "The Effect of Speech Instruction on the Ability of Classroom Teachers to Select Children for Speech Therapy" (M.A. Thesis, Ohio State University, 1963).

Luper[18] prepared silent motion pictures and tape recordings of 33 stutterers speaking short phrases. Luper found that more information about stuttering is obtained from judging visual recordings of stuttered speech than from acoustical recordings of the same speech acts. "Stuttering was judged to be present on 133 of the visual samples, but on only 77 of the acoustical samples" (p. 339). Williams, Wark, and Minifie[19] (1963) in comparing audio, visual, and audiovisual cues in rating stuttering, reported that reliabilities of stuttering frequencies and scale values of stuttering severity are greater when obtained by audio or audiovisual observation than by visual observation alone, but that there was no significant difference between ratings made from the audio condition as compared to the combined audiovisual. These authors suggest that ". . . the use of audio cues alone is sufficient for obtaining useful and reliable measures of frequency and of severity of stuttering."

In Tuthill's[20] experiment with stutterers, some judges were presented sound motion pictures and to others only the sound tract was presented. Essentially the same results occurred when the sound track was presented alone as when sound motion picture was played.

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[18] Harold L. Luper, "Consistency of Stuttering in Relation to Goal Gradient Hypothesis," The Journal of Speech and Hearing Disorders, 21 (1956), pp. 336-342.

[19] Dean E. Williams, Michelle Wark, and Fred D. Minifie, "Rating of Stuttering by Audio, Visual, and Audiovisual Cues," Journal of Speech and Hearing Research, 6 (1963), pp. 91-100.

[20] Curtis E. Tuthill, "A Quantitative Study of Extensional Meaning With Special Reference to Stuttering," Speech Monographs, 13 (1946), pp. 81-98.

No study has come to the attention of this investigator concerning audiovisual representation of misarticulations.

Judges have been evaluated in terms of ability to assess "global" rating ability (over-all "goodness" of connected speech). Burgi and Matthews[21] compared four groups of judges of different levels of sophistication. According to the results, there was no superiority of any one group over another in ability to make global ratings of speech.

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[21] Ernest J. Burgi and Jack Matthews, "Effects of Listener Sophistication upon Global Ratings of Speech Behavior," Journal of Speech and Hearing Research, 3 (1960), pp. 348-353.

An understanding of the evaluation of speech deviations under different types of conditions, as audio versus audiovisual and with the use of different types of stimuli, such as words as compared with phrases and sentences, would appear essential in understanding more clearly the problem of functional misarticulations.

Statement of the Problem

If we are to deal effectively with children having functional misarticulation, which constitute our largest category of speech handicaps in the public schools, we must have a reliable method for ascertaining the proficiency of speech clinicians in the recognition of sound errors in speech. At the present time, there is no standardized test available to determine the reliability of persons in the recognition of errors of speech. Unless such a test is constructed and more definitive standards of phonetic (sound) accuracy adopted by those people who work directly with children having speech deviations, the judgments of speech clinicians and researchers are open to question.

An audiovisual test for the evaluation of speech-error recognition ability is desirable for use with clinicians in training. The test could be given before and after training as a measure of the effectiveness of speech courses on the clinician's ability to recognize phonetic inaccuracies. Such an instrument could also be used to evaluate differences between experienced and inexperienced clinicians. It would appear that such a tool would facilitate research in speech pathology. At the universities, the prospective researcher could establish the reliability of his own judgment of speech errors through the use of the test. This procedure would eliminate the time-consuming use of panels of judges.

In diagnosing speech-handicapped school children, efforts have been made to reduce the subjectivity in diagnosis by assigning ratings of severity to children having articulatory problems. Although a high agreement of reliability between examiners on rating scales of severity has been found, little has been done to ascertain the validity of the examiner's judgments. The aim has been to reduce the subjectivity in diagnosis through analysis and construction of rating scales and methods rather than through emphasis upon the investigation of the individual sound deviations and of the raters themselves.

Objectives of the Study

The purpose of the proposed study was to prepare a valid and reliable audiovisual test for use in ascertaining the reliability of speech clinicians and researchers in the recognition of phonetic (sound) errors in speech. The specific objectives were as follows:

1. To develop an audiovisual test for use in training students in the reliable identification of phonetic errors in speech.

2. To develop a standardized audiovisual test for use by speech clinicians for ascertaining their own reliability in judging articulatory errors.
3. To develop an audiovisual test which may be used by researchers to determine reliability in making judgments of articulatory errors.

Experimental Questions

The following experimental questions were asked:

1. Is there a difference in the ability of experienced therapists, inexperienced therapists, or classroom teachers to identify phonetic errors (misarticulations) in response to audiovisual or audio methods?
2. Is there a difference between the recognition of phonetic errors when the sound occurs in isolation (_b_ird) and when the same sound occurs in a phrase (see the _b_ird) and in "trio's"? (watch, pin, _b_ird)
3. Is there a difference between the recognition of phonetic errors from audiovisual representations of the stimuli as compared to the audio presentation?

Definition of Terms

Articulation - the efficient movements and operations of the speech articulators in producing a sound or sequence of sounds so it is instantly identified by the listener and therefore conveys the meaning of the code.

Misarticulation - the inefficient movements and operations of the speech articulators in producing a sound or sequence of sounds so it is instantly identified by the listener as being misarticulated and thereby affects the listener's reaction to the code whose meaning is being conveyed.

Identification - the manner in which a sound is perceived, as being either correctly articulated or misarticulated by a group of listeners.

Subject - a listener participating in this experiment upon which the statistically founded results and conclusions are to be drawn.

Organization of the Discussion

Introduction, statement of the problem, purposes of the study, and definition of terms were included in this chapter. Included in Chapter II is a description of the subjects, stimuli, equipment, and experimental conditions. In Chapter III the hypotheses are stated, the statistical treatment of the data, and the statement of the results are presented and discussed. The summation, conclusions, and implications for further research are included in Chapter IV.

CHAPTER II

PROCEDURES

Construction of the audiovisual films and answers to the experimental questions required the following steps: (1) Preparation of the film tests--selection of material to be filmed, selection of children for the films, equipment and filming conditions, and (2) Presentation of film tests to subjects--selection of subjects, equipment, and conditions of the experiment.

Preparation of the Film Tests

Selection of Stimuli. In order to test the responses of listeners in their identification of misarticulations, an articulation test was constructed to meet the needs of the specific research proposal and suitable for eliciting responses from children between the ages of 6 to 13. Two sets of 4 x 6 file cards each containing 23 words represented by appropriate pictures (Set one - List A; Set two - List B) were prepared to illustrate the test words. Each word contained two consonant sounds so that a total of 43 sounds (23 initial and 20 final) could be tested (Table I). This procedure cut the testing time down considerably since most standard articulation tests test only one sound at a time.

The stimulus items were recorded in three different series in order to determine which series, or if all of the series, would be suitable for testing differences in the recognition of articulatory errors. For example, "gun" would be tested as an isolated word; "shoot the gun" in a phrase; and "ring, gun, jail" as part of a trio.

TABLE 1

WORD LISTS A AND B

Word List A	Word List B
1. gun	1. goat
2. church	2. five
3. vine	3. yard
4. this	4. rose
5. thumb	5. wave
6. hand	6. log
7. nose	7. wheel
8. fish	8. sheep
9. white	9. match
10. cage	10. that
11. door	11. sing
12. teeth	12. cake
13. jail	13. half
14. mouse	14. tooth
15. ring	15. voice
16. zip	16. knob
17. book	17. chair
18. pig	18. juice
19. web	19. thin
20. leaf	20. zoom
21. yarn	21. page
22. shave	22. bathe
23. smooth	23. dish

These sound elements were judged suitable for children in the elementary grades.[22] The words were illustrated on 4 x 6 cards (Appendix B).

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[22] Edward Lee Thorndike, 1921, The Teacher's Word Book, New York: Bureau of Publications, Teachers College, Columbia University.

Equipment and Recording Conditions for Preliminary Data. Tape recordings were made at three of the Grove City Public Schools, Southwestern Public School District. Sound pressure level of each room was determined in order to maintain constant ambient noise levels throughout the recording procedures. This was accomplished with a General Radio Sound Level Meter. All recordings were made on an Uher Universal S tape recorder. Scotch Brand type 111-6 was used at the speed of 3-3/4 i.p.s.

The subjects recorded two lists of 23 words each, saying words from each list separately and in random order in "trios" or three words at a time, phrases, and in isolation. This was achieved through instructing the subject to say the names of the pictures before him when the examiner signaled with each revolution of a six-second sweep hand timer. Final recordings were edited and re-recorded on an Uher Universal S tape recorder for presentation to a panel of judges with basic training, 50 judges with advanced training, and 50 judges (classroom teachers) without training in speech therapy.

The series of words, phrases, and "trios" were played to the panels of trained and untrained listeners for scoring. Series One contained the words in isolation; Series Two, in phrases; and Series Three in "trios." Both Series One and Two proved to be appropriate for the film test; Series Three appeared to be most suitable in distinguishing differences between the panels of trained and untrained listeners.

Stimuli for the Final Test. As a result of the preliminary study, it was determined that the final film script should contain in part Series One, Two, and Three of Word Lists A and B with time intervals of 3 seconds between Series One (words in isolation) four seconds between Series Two (word in phrases) and six-second intervals between words in Series Three (words in trios).

Each film contained a total of 558 sounds which were to be judged for accuracy. The six children spoke the series of words, phrases, and "trios" in randomized order. Each child said 23 words in isolation, so six sets of 23 isolated words appeared in each test, or a total of 276 sounds. Only three children spoke the phrases with a total of 138 sounds, and only three children spoke "trios" with 144 sounds.

Selection of Children for Film. Six children enrolled in speech therapy at the Grove City Public Schools, Southwestern Public School District, Columbus, Ohio, were selected for the film. All of the children diagnosed as having functional misarticulations were selected as a representative group of children having from moderately to severely misarticulated speech. None of the children included in the study had defective hearing, as determined by pure tone audiometric screening of the speech frequencies. The chronological age range of the children was from six and one-half to thirteen years.

Production of Films. Filming was done at the Motion Picture Studios, Department of Photography, The Ohio State University. The children were instructed to wear light or pastel colored clothes so that the technicolor would show to best advantage. The children were filmed saying words in isolation, phrases, and trios for the purposes of testing the identification of 43 phonetic elements by experienced speech clinicians, classroom teachers, and college seniors majoring in speech and hearing therapy.

The filming and recording of the responses of the children was achieved through instructing the individuals to say the names of the pictures held before him when the examiner signaled with each revolution of a six-second sweep hand timer. Only the head and shoulders of each child were filmed.

A blimped arriflex 16 mm. camera with synchronized motor and 50 mm. lens was used at a distance of 7 feet, with a lens opening of 2.8 and 1 to 4 lighting ratio to photograph the children. Camera was at eye level.

The film used was Eastman Commercial Ekta-Chrome 17255 emulsion. Sound information was recorded on a magnasync 16 mm. tape recorder, through an electrovoice 666 microphone. The order of subjects was selected at random and film pauses calculated exactly by frame count.

Presentation of Film Test to Subjects

Selection of Judges for the Experiment. Three groups of judges served as evaluators of the items in the audiovisual and audio (only) representations of sounds in phrases, words, and trios. Group One which served as the criterion group was composed of 50 experienced clinicians with the equivalency of the basic certificate in ASHA and five or more years of experience. Group Two and Group Three, the noncriterion groups, consisted of 50 graduating senior majors in speech and hearing therapy and 50 classroom teachers with no speech training. Names and information regarding training and experience of the criterion judges participating in the experiment are given in Appendix A.

Experimental Conditions. The film was shown by 16 mm. projector. The following directions were given to the panels of trained and untrained listeners:

> ### Directions
>
> At the present time there is no standardized method of measuring a speech clinician's ability to recognize accurately various kinds of articulatory problems. The purpose of this film test is the construction of a quantitative measure whereby a score can be assigned to assess the critical ability of a clinician in the identification of misarticulations.
>
> You are about to see two films, each approximately 20 minutes in length. Each film contains 12 segments of 6 children, presented in random order saying a series of words in phrases, in isolation or in "trios." For example, a segment could contain phrases such as "have a watch," "take a pin," "see the bird" as in isolation such as "watch," ______________ "pin" ______________ "bird" ______________ or in trios such as "watch, pin, bird." There will be intervals of 4 seconds between each phrase, 3 seconds between words in isolation and 6 seconds between words in "trios." You will draw a line through the circled sounds in those words in which you identify a misarticulation (omission, substitution, or distortion).
>
> You may find it easier to read your score sheet first, so that you know in advance what words the children are going to say and then score your sheet. It may also be easier to hold your papers up higher on your laps so that you will not constantly have to move your head up and down.
>
> Flip pages quickly when you are through with each page and as quietly as possible so as not to disturb your neighbor.
>
> For the first film odd numbered individuals will not look at the film, you will score the audio only. For the second film everyone will watch as well as just listen. For the last showing the first film will be shown again and this time the even numbered individuals will not look at the film. It will then be your chance to score the audio only.

> There will be a five-minute break between each showing. We are ready to begin; are there any questions?

Copies of forms for recording data in response to Audiovisual Films A and B will be found in the Appendix.

Scoring of the Test

The test for each subject was scored by an empirically derived "answer" sheet of right and wrong answers for each of the 558 items in each of the two films (Film A and B). Two clinicians (the principal investigator of this research, Ruth B. Irwin, and Mary Lou Rush) with many years of experience with articulatory deviations and holding Advanced Certification in the American Speech and Hearing Association viewed both Films A and B repeatedly in a sound-treated booth (projector was situated outside booth with film projected through window of booth) until both observers agreed on "correct" answers.

Data were punched on IBM cards at the Statistical Laboratory (Department of Mathematics) and sent to Numerical Computation Laboratory for computational services. The analyses of the data and preparation of tables was done at the Statistical Laboratory (Department of Mathematics).

Summary

In this chapter, the procedures used in this study were discussed. Two forms of an audiovisual test for identifying misarticulations were constructed providing for a total of 558 sounds in each test. Each film was presented to 150 judges, 50 in each of three groups: Group I, experienced clinicians; Group II, graduating senior majors in speech and hearing therapy; and Group III, classroom teachers. The hypotheses, analyses of data, and results will be presented in the next chapter.

CHAPTER III

ANALYSIS AND RESULTS

The purpose of this research was to construct an audiovisual film which would be valid and reliable for use by clinicians and researchers in establishing individual reliability in the recognition of articulatory errors.

Tabulation of Data

One hundred fifty individuals were divided into three groups of fifty each: Group I, experienced clinicians, Group II, inexperienced clinicians, Group III, classroom teachers. Each of the one hundred fifty individuals took the three tests: Film A,audio only; Film A, audiovisual; and Film B, audiovisual.

Each test consisted of 558 sounds divided as follows: 138 sounds occurred in phrases, 2 to a phrase in 3 sets of 23 phrases; 276 sounds occurred in isolation, 2 to a word in 6 sets of 23 words; 144 sounds occurred in "trios," 2 in each of 3 words in 3 sets of 8 "trios." Each sound could be correct or incorrect according to empirically derived answers. A tabulation of these numbers may be found in Table 2.

TABLE 2. NUMBER OF RESPONSES OR POSSIBLE PLACES OF MISARTICULATION

		Film A			Film B		
		Number of Misarticulations	Number of Correct Sounds	Total	Number of Misarticulations	Number of Correct Sounds	Total
Phrases	1	17	29	46	16	30	46
	5	12	34	46	10	36	46
	9	9	37	46	7	39	46
Phrases Total		38	100	138	33	105	138
Isolation	2	10	36	46	6	40	46
	4	13	33	46	16	30	46
	6	23	23	46	20	26	46
	8	10	36	46	10	36	46
	10	11	35	46	9	37	46
	12	23	23	46	22	24	46
Isolations Total		90	186	276	83	193	276
Trios	3	26	22	48	23	25	48
	7	11	37	48	11	37	48
	11	16	32	48	22	26	48
Trios Total		53	91	144	56	88	144
TOTAL		181	377	558	172	386	558

In Table 3, the results of the tests for Film A, audio, are shown by sets, one to twelve, and according to the three groups. For example, in the first row of Table 3, it will be noted that 50 people in Group I identified 609 misarticulations correctly in phrases, Set I. According to Table 3, there were 17 x 50 = 850 possible misarticulations for Set I of phrases. The average number was 12.180 out of 17 possible and the standard deviation was 1.746. The same 50 people identified 169 correct sounds as misarticulations. From Table 2, there were 29 x 50 = 1450 of these sounds. The average for the group was 3.38 out of 29. In total, an individual had 17 x 29 = 46 places to be right or wrong. The same people as above had an average correct response of 37.800 with a standard deviation of 3.003.

In Tables 4 and 5, the results of Films A and B, audiovisual, are presented.

The data shown in Tables 3, 4, and 5 are summarized in Tables 6, 7, and 8 which show the results of tests of significance between the groups. For example, in Table 6 under phrases, the total responses occurring for phrases 1, 5, and 9 are given (1138). These totals were converted to percentages. Thus, Group I correctly identified 59.9 per cent of the misarticulations in phrases. The F of 6.60 shows the groups differ and the number 6.57 is a critical difference at the 5 per cent level for the group percentages.

TABLE 3. RESULTS OF TESTS BY SETS FOR FILM A (AUDIO).

		Correctly Identified As Misarticulations			Incorrectly Identified As Misarticulations			Correct Responses		
Phrases	Gr.	Total	Mean	St. Dev.	Total	Mean	St. Dev.	Total	Mean	St. Dev.
1	1	609	12.180	1.746	169	3.380	2.863	1890	37.800	3.003
	2	594	11.880	2.430	163	3.260	3.016	1881	37.620	2.962
	3	541	10.820	2.229	150	3.000	2.390	1841	36.820	2.379
5	1	270	5.400	2.441	124	2.480	1.555	1846	36.920	2.284
	2	307	6.140	2.433	137	2.740	1.782	1870	37.400	2.222
	3	249	4.980	2.495	141	2.820	2.077	1808	36.160	2.427
9	1	259	5.180	2.154	145	2.900	2.742	1964	39.280	2.176
	2	278	5.560	1.820	131	2.620	1.701	1997	39.940	1.800
	3	206	4.120	1.825	109	2.180	2.126	1947	38.940	2.334

Table 3 (continued)

		Correctly Identified As Misarticulations			Incorrectly Identified As Misarticulations			Correct Responses		
Isolation	Gr.	Total	Mean	St. Dev.	Total	Mean	St. Dev.	Total	Mean	St. Dev.
2	1	340	6.800	1.616	115	2.300	2.978	2025	40.500	2.605
	2	334	6.680	1.720	114	2.280	5.035	2020	40.400	4.777
	3	271	5.420	1.864	94	1.880	1.859	1977	39.540	2.111
4	1	471	9.420	2.001	199	3.980	2.759	1922	38.440	3.764
	2	506	10.120	1.814	189	3.780	4.501	1967	39.340	4.303
	3	427	8.540	1.541	171	3.420	2.295	1906	38.120	2.504
6	1	747	14.940	2.551	211	4.220	2.350	1686	33.720	3.137
	2	715	14.300	2.697	206	4.120	2.228	1659	33.180	2.775
	3	589	11.780	3.228	206	4.120	2.463	1533	30.660	3.414
8	1	229	4.580	2.051	85	1.700	1.898	1944	38.880	1.996
	2	277	5.540	2.169	101	2.020	1.647	1976	39.520	1.752
	3	220	4.400	2.222	92	1.840	1.695	1928	38.560	1.775
10	1	394	7.880	1.698	256	5.120	2.210	1388	27.760	2.200
	2	369	7.380	1.627	197	3.940	1.834	1422	28.440	1.656
	3	304	6.080	2.108	167	3.340	2.387	1387	27.740	2.127
12	1	863	17.260	2.633	164	3.280	2.214	1849	36.980	2.839
	2	871	17.420	3.252	134	2.680	1.435	1887	37.740	2.702
	3	731	14.620	3.446	133	2.660	1.698	1748	34.960	3.017

Table 3 (continued)

		Correctly Identified As Misarticulations			Incorrectly Identified As Misarticulations			Correct Responses		
	Gr.	Total	Mean	St. Dev.	Total	Mean	St. Dev.	Total	Mean	St. Dev.
Trios										
3	1	905	18.100	3.370	51	1.020	1.801	1954	39.080	3.212
	2	976	19.520	3.593	77	1.540	3.112	1999	39.980	3.695
	3	756	15.120	3.108	87	1.740	1.601	1769	35.380	3.337
7	1	340	6.800	2.176	306	6.120	3.378	1884	37.680	2.736
	2	276	5.520	2.140	232	4.640	2.380	1894	37.880	2.413
	3	245	4.900	1.982	201	4.020	2.752	1894	37.880	1.881
11	1	527	10.540	3.045	409	8.180	4.109	1718	34.360	2.995
	2	543	10.860	3.003	429	8.580	4.209	1714	34.280	3.332
	3	402	8.040	3.044	300	6.000	3.681	1702	34.040	3.017

TABLE 4. RESULTS OF TESTS BY SETS FOR FILM A (AUDIOVISUAL)

		Correctly Identified As Misarticulations			Incorrectly Identified As Misarticulations			Correct Responses		
	Gr.	Total	Mean	St. Dev.	Total	Mean	St. Dev.	Total	Mean	St. Dev.
Phrases										
1	1	650	13.000	1.979	163	3.260	2.389	1937	38.745	2.048
	2	643	12.860	2.119	128	2.560	1.387	1965	39.300	1.843
	3	572	11.440	2.434	235	4.700	3.079	1787	35.740	2.702
5	1	277	5.540	2.187	126	2.520	1.681	1851	37.020	2.272
	2	330	6.600	2.268	133	2.660	1.880	1897	37.940	2.445
	3	283	5.660	2.446	198	3.960	3.149	1785	35.700	2.957
9	1	326	6.653	1.378	165	3.367	2.514	2011	40.286	2.415
	2	334	6.680	1.377	132	2.640	1.770	2052	41.040	1.603
	3	273	5.460	1.897	174	3.480	3.209	1949	38.980	2.567

Table 4 (continued)

		Correctly Identified As Misarticulations			Incorrectly Identified As Misarticulations			Correct Responses		
	Gr.	Total	Mean	St. Dev.	Total	Mean	St. Dev.	Total	Mean	St. Dev.
Isolation										
2	1	328	6.560	1.358	103	2.060	2.622	2025	40.500	2.443
	2	326	6.520	1.446	73	1.460	0.885	2053	41.060	1.583
	3	292	5.840	1.670	164	3.280	3.769	1928	38.560	3.321
4	1	541	10.820	1.320	185	3.700	2.112	2006	40.120	2.404
	2	571	11.420	1.341	128	2.560	1.146	2093	41.860	1.641
	3	488	9.760	1.546	170	3.400	2.587	1968	39.360	2.709
6	1	807	16.140	2.416	159	3.180	1.945	1798	35.960	2.777
	2	747	14.940	2.979	184	3.680	1.963	1713	34.260	3.076
	3	673	13.460	2.517	253	5.060	3.449	1570	31.400	4.020
8	1	246	5.020	2.015	80	1.633	1.654	1966	39.388	1.935
	2	299	5.980	1.974	120	2.400	1.666	1979	39.580	2.071
	3	246	4.920	2.108	146	2.920	2.546	1900	38.000	2.304
10	1	394	8.041	1.485	195	3.980	3.437	1449	29.061	3.262
	2	375	7.500	1.568	128	2.560	1.500	1497	29.940	1.504
	3	358	7.160	1.800	200	4.000	2.785	1408	28.160	2.444
12	1	927	18.540	2.697	138	2.760	1.572	1939	38.780	2.332
	2	944	18.880	2.553	156	3.120	1.586	1938	38.760	2.335
	3	833	16.660	3.185	165	3.300	1.865	1818	36.360	3.076

Table 4 (continued)

		Correctly Identified As Misarticulations			Incorrectly Identified As Misarticulations			Correct Responses		
	Gr.	Total	Mean	St. Dev.	Total	Mean	St. Dev.	Total	Mean	St. Dev.
Trios										
3	1	962	19.240	3.230	46	0.920	1.104	2016	40.320	2.773
	2	985	19.700	3.477	67	1.340	1.394	2018	40.360	3.275
	3	801	16.020	3.153	106	2.120	2.265	1795	35.900	4.263
7	1	356	7.120	1.859	265	5.300	3.032	1941	38.820	2.229
	2	287	5.740	1.509	173	3.460	1.854	1964	39.280	1.703
	3	265	5.300	2.102	246	4.920	3.457	1869	37.380	3.023
11	1	620	12.400	1.784	443	8.860	4.170	1777	35.540	3.477
	2	607	12.140	2.595	473	9.460	4.320	1734	34.680	3.531
	3	483	9.660	2.623	461	9.220	4.278	1622	32.440	3.609

TABLE 5. RESULTS OF TESTS BY SETS FOR FILM B (AUDIOVISUAL).

		Correctly Identified As Misarticulations			Incorrectly Identified As Misarticulations			Correct Responses		
	Gr.	Total	Mean	St. Dev.	Total	Mean	St. Dev.	Total	Mean	St. Dev.
Phrases 1	1	665	13.300	1.249	229	4.580	3.517	1936	38.720	3.058
	2	638	12.760	1.572	210	4.200	1.678	1928	38.560	2.072
	3	621	12.420	1.667	224	4.480	2.533	1897	37.940	2.559
5	1	233	4.660	2.404	173	3.460	2.484	1860	37.200	2.650
	2	309	6.180	2.192	164	3.280	1.938	1945	38.900	2.418
	3	232	4.735	2.490	177	3.612	2.760	1855	37.122	2.682
9	1	282	5.640	0.875	197	3.940	3.119	2035	40.700	3.196
	2	284	5.680	0.819	188	3.760	2.026	2046	40.920	1.850
	3	231	4.714	1.633	193	3.939	3.816	1988	39.776	3.448

Table 5 (continued)

	Gr.	Correctly Identified As Misarticulations Total	Correctly Identified As Misarticulations Mean	Correctly Identified As Misarticulations St. Dev.	Incorrectly Identified As Misarticulations Total	Incorrectly Identified As Misarticulations Mean	Incorrectly Identified As Misarticulations St. Dev.	Correct Responses Total	Correct Responses Mean	Correct Responses St. Dev.
Isolation										
2	1	220	4.400	1.229	223	4.460	3.394	1997	39.940	3.119
	2	227	4.540	1.216	188	3.760	1.847	2039	40.780	1.607
	3	151	3.020	1.518	239	4.780	3.472	1912	38.240	3.061
4	1	561	11.220	2.063	131	2.620	2.899	1930	38.600	3.051
	2	557	11.140	1.852	87	1.740	1.468	1970	39.400	2.204
	3	493	9.860	2.321	119	2.380	2.506	1874	37.480	3.072
6	1	819	16.380	2.118	168	3.360	3.256	1951	39.020	3.548
	2	809	16.180	2.345	223	4.460	2.720	1886	37.720	2.843
	3	690	14.082	3.421	245	5.000	3.195	1745	35.082	3.439
8	1	254	5.080	2.098	135	2.700	1.776	1919	38.380	2.108
	2	299	5.980	1.922	175	3.500	1.705	1924	38.480	1.876
	3	214	4.367	1.933	169	3.449	2.731	1845	36.918	2.499
10	1	311	6.220	1.433	301	6.020	4.088	1860	37.200	3.714
	2	286	5.720	1.325	259	5.180	2.447	1877	37.540	2.197
	3	253	5.163	1.688	252	5.143	3.846	1851	37.020	
12	1	842	16.840	2.142	214	4.280	1.578	1828	36.560	2.168
	2	808	16.160	2.298	201	4.020	1.532	1807	36.140	2.232
	3	731	14.620	4.184	169	3.380	1.689	1762	34.240	3.532

Table 5 (continued)

	Gr.	Correctly Identified As Misarticulations			Incorrectly Identified As Misarticulations			Correct Responses		
		Total	Mean	St. Dev.	Total	Mean	St. Dev.	Total	Mean	St. Dev.
Trios										
3	1	984	19.680	2.055	157	3.140	2.195	2077	41.540	2.720
	2	966	19.320	2.478	162	3.240	2.016	2054	41.080	2.098
	3	886	17.720	3.124	169	3.380	2.338	1967	39.340	4.236
7	1	335	6.700	1.919	253	5.060	3.053	1932	38.640	2.632
	2	310	6.200	1.629	183	3.660	2.608	1977	39.540	2.612
	3	264	5.388	2.100	222	4.531	3.042	1892	37.857	2.769
11	1	727	14.540	3.547	349	6.980	3.329	1678	33.560	3.265
	2	755	15.100	3.118	363	7.260	3.832	1692	33.840	2.598
	3	605	12.100	4.386	307	6.140	3.493	1598	31.960	3.568

TABLE 6. TESTS OF SIGNIFICANCE AMONG GROUPS FOR FILM A (AUDIO).

	Correctly Identified As Misarticulations				Incorrectly Identified As Misarticulations				Correct Responses			
Group	Total	%	F	CD%	Total	%	F	CD%	Total	%	F	CD%
					PHRASES							
1	1138	59.9	6.60*	6.57	438	8.8	0.28	2.55	700	82.6	4.65*	1.75
2	1179	62.1			431	8.6			748	83.3		
3	996	52.4			400	8.0			596	81.1		
					ISOLATIONS							
1	3044	67.6	19.32*	5.05	1030	11.1	1.248	2.69	2014	82.0	10.01*	1.80
2	3072	68.3			941	10.1			2131	82.8		
3	2542	56.5			863	9.3			1679	79.6		
					TRIOS							
1	1772	66.9	19.56*	6.28	766	16.8	3.79*	3.59	1006	77.2	10.10*	1.89
2	1795	67.7			738	16.2			1057	77.9		
3	1403	52.9			588	12.9			815	74.5		

*Significant F at 5 per cent level > 3.07.

TABLE 7. TESTS OF SIGNIFICANCE AMONG GROUPS FOR FILM A (AUDIOVISUAL).

	Correctly Identified As Misarticulations				Incorrectly Identified As Misarticulations				Correct Responses			
Group	Total	%	F	CD%	Total	%	F	CD%	Total	%	F	CD%
					PHRASES							
1	1253	65.9	7.63*	6.00	454	9.1	6.30*	2.88	799	84.0	31.59*	1.75
2	1307	68.8			393	7.9			914	85.7		
3	1128	59.4			607	12.1			521	80.0		
					ISOLATIONS							
1	3243	72.1	13.24*	4.35	860	9.2	5.35*	2.46	2383	84.7	30.06*	1.65
2	3262	72.5			789	8.5			2473	85.3		
3	2890	64.2			1098	11.8			1792	80.4		
					TRIOS							
1	1938	73.1	23.49*	5.48	754	16.6	1.08	3.54	1184	79.6	34.82*	1.98
2	1879	70.9			713	15.7			1166	79.4		
3	1549	58.5			813	17.9			736	73.4		

*Significant F at 5 per cent level > 3.07.

TABLE 8. TESTS OF SIGNIFICANCE BETWEEN GROUPS FOR FILM B (AUDIOVISUAL).

	Correctly Identified As Misarticulations				Incorrectly Identified As Misarticulations				Correct Responses			
Group	Total	%	F	CD%	Total	%	F	CD%	Total	%	F	CD%
					PHRASES							
1	1180	71.5	6.20*	5.67	599	11.4	0.20	3.12	581	84.5	4.52*	2.03
2	1231	74.6			562	10.7			669	85.8		
3	1084	65.7			594	11.3			490	83.2		
					ISOLATIONS							
1	3007	72.5	17.01*	5.01	1172	12.1	0.19	2.98	1835	83.2	17.35*	1.65
2	2986	72.0			1133	11.7			1853	83.4		
3	2532	61.0			1193	12.4			1339	79.6		
					TRIOS							
1	2046	73.1	11.64*	5.53	759	17.3	0.35	3.83	1287	79.0	11.44*	1.98
2	2031	72.5			708	16.1			1323	79.5		
3	1755	62.7			698	15.9			1057	75.8		

*Significant F at 5 per cent level > 3.07.

The Hypotheses

In order to evaluate the audiovisual test, five specific hypotheses were tested.

1. There is no difference in the ability of experienced clinicians (five years or more of experience), graduating senior majors in speech and hearing therapy, and classroom teachers to recognize phonetic errors in response to audiovisual or audio (only) methods.

2. There is no significant difference among the groups in the recognition of phonetic errors when the sound occurs in a word (pig), phrase (catch a pig), and "trio" (book, pig, zip).

3. There is no significant difference among the groups in the recognition of phonetic errors from the audiovisual representations as compared to the audio representation in Film A.

4. There are no significant differences among the groups in the identification of phonetic errors when Audiovisual Film A and Audiovisual Film B are compared.

5. There are no significant differences among the three groups in their identification of specific sounds in Film A.

Analysis of Experimental Questions

Hypothesis One: There is no significant difference among the three groups in ability to identify phonetic errors in response to stimuli represented by Film A (audio), Film A (audiovisual), or Film B (audiovisual).

Both Groups I and II were significantly different (5 per cent level) from Group III in the correct identification of misarticulations and total correct responses for all three conditions: Film A (audio), Film A (audiovisual), and Film B (audiovisual). Groups I and II were not significantly different, but Group III identified significantly fewer misarticulations than either Group I or II (Tables 6, 7, and 8). The classroom teachers falsely identified significantly more misarticulations than either the experienced clinicians or graduating seniors for Film A (audiovisual) (Table 7).

Hypothesis Two. To test the hypothesis, that there is no significant differences among the groups in the recognition of the phonetic errors when occurring in a word, phrase, or "trio," the _t_ test for related measures was used. The scores were converted to percentage scores and the _t_ test was based on differences between percentage scores. The second item was subtracted from the first. For instance, -5.988 resulted from subtracting the scores for isolation from scores for phrases. Since scores for isolation were larger than those for phrases, the minus figure (-5.988) resulted for number of accurate identifications of misarticulations for Group I.

As will be noted by Table 9, accurate identification of misarticulations in isolated words is significantly (beyond 1 per cent level) better than in phrases for all three groups of judges.

Other results of the analysis of Hypothesis One are as follows:

1. For Groups I and II, accurate identification of misarticulations in "trios" was significantly better than in phrases (beyond 1 per cent level).

TABLE 9. t's FOR TESTING DIFFERENCES AMONG PHRASES, ISOLATION, AND TRIOS

Comparison	Misarticulations Correct	Misarticulations Incorrect	Total Correct Responses
Group I			
Phrases-Isolation	-5.988**	-4.855**	-9.188**
Phrases-Trio	-4.202**	-9.185**	-6.316**
Isolation-Trio	.605	-7.793**	1.046
Group II			
Phrases-Isolation	-5.054**	-3.098**	-11.404**
Phrases-Trio	-4.622**	-10.470**	-7.007**
Isolation-Trio	.462	-8.521**	1.488
Group III			
Phrases-Isolation	-3.002**	-2.804**	-8.204**
Phrases-Trio	- .347	-6.584**	-5.017**
Isolation-Trio	3.432	-6.306**	2.112*

*Significant t at 5 per cent level > 1.68, df 49.

**Significant t at 1 per cent level > 2.70, df 49.

2. No significant difference occurs for Groups I and II between isolation and "trio" for accurate identification of misarticulations, but identification of misarticulations in isolated words is significantly better for judges (classroom teachers) in Group III (beyond 1 per cent level).

3. In falsely identifying sounds as misarticulations, significant differences (beyond 1 per cent level) occurred for all three groups. The judges made more mistakes in falsely identifying as errors the sounds occurring in isolation and "trios" than in phrases, and in "trios" than in isolation.

4. For total "correct" responses (correct misarticulations identified and correct sounds not falsely identified as misarticulations), all groups of judges were significantly different in their responses for comparisons of phrases with isolation and phrases with trios (beyond 1 per cent level). The total correct responses were significantly better for sounds in isolation than for those in phrases, and for sounds in "trios" than for those in "phrases" for all three groups. It would appear from this data that the correct identification of sounds is better in either isolation or trios than when occurring in phrases. The _t's_ for total correct responses are near the 5 per cent level in favor of isolation as compared to trios for Groups I and II. The difference between isolation and trio is significantly (5 per cent level) in favor of isolation for Group III.

Hypothesis Three. There is no significant difference among the groups in the recognition of phonetic errors from the audiovisual representations as compared to the audio (only) representation in Film A. The t test for related measures was used. The audiovisual scores were subtracted from the audio scores which accounted for the negative t's since the audiovisual scores were larger.

According to Table 10, the accurate identification of misarticulations is significantly better for audiovisual representations than for audio (only) for all three groups. Total correct responses are significantly better for all three groups. Total correct responses are significantly better for audiovisual method for Groups I and II for isolation, phrases, and "trios." Group III is not significantly different in total correct responses by audiovisual and audio (only) methods. The classroom teachers falsely identified significantly more misarticulations when audiovisual method was used than audio (only).

Hypothesis Four. There are no significant differences among the groups in the identification of phonetic errors when audiovisual Film A and Audiovisual Film B are compared. The scores for Film B were subtracted from the scores for Film A. The negative t values indicate that the scores for Film B were higher than those for Film A.

According to Table 11, no significant differences occur between the two films for the correct identification of misarticulations in isolation (words) for any of the three groups. The classroom teachers (Group III) did not respond differently to the two forms when total responses for isolated words were considered. However, both Groups I and II favored significantly Film A for total correct responses for isolated words.

TABLE 10. t VALUES (49 d.f.) OF DIFFERENCES BETWEEN AUDIO AND AUDIOVISUAL, FILM A

(Audio scores were subtracted from audiovisual score).

Group	Misarticulations Correct	Misarticulations Incorrect	Total Correct Responses
	PHRASES		
1	-3.795**	- .445	-2.243*
2	-4.224**	1.056	-3.763**
3	-4.356**	-5.755**	1.700*
	ISOLATION		
1	-3.999**	2.530*	-5.102**
2	-3.818**	2.262*	-4.729**
3	-6.999**	-3.497**	-1.562
	TRIO		
1	-3.933**	.282	-4.138**
2	-1.990*	.588	-2.534*
3	-3.459**	-5.289**	1.837*
	TOTAL		
1	- 6.67**	1.90*	-6.80**
2	- 5.59**	2.46*	-6.49**
3	- 8.70**	-7.64**	.43

*Significant t at 5 per cent level > 1.68.

**Significant t at 1 per cent level > 2.41.

TABLE 11. t VALUES (49 d.f.) OF DIFFERENCES BETWEEN AUDIOVISUAL FILM A AND AUDIOVISUAL FILM B

(Scores for Film B were subtracted from scores for Film A).

	Misarticulations Correct	Misarticulations Incorrect	Total Correct Responses
Group			
	PHRASES		
1	-3.812**	-3.966**	-0.635
2	-5.311**	-5.536**	-0.184
3	-4.909**	0.834	-4.934**
	ISOLATION		
1	-0.321	-6.068**	3.523**
2	0.607	-7.735**	5.428**
3	1.841	-0.881	1.266
	TRIO		
1	0.296	-0.734	1.243
2	-1.377	-0.525	-0.168
3	-3.314**	1.952	-3.679**
	TOTAL		
1	25.850*	-8.134**	13.378**
2	35.312*	-15.308**	16.588**
3	17.297*	-1.844	2.399*

*t > 2.008 for 5% significance
**t > 2.678 for 1% significance

For total correct responses for phrases, only the classroom teachers showed significant difference in favor of Film B. All three groups favored Film B for the correct identification of misarticulations.

The correct identification of misarticulations in trios is significantly different in favor of Film B for the classroom teachers. For the first two groups (experienced clinicians and graduating seniors), the two films were not significantly different for number of correct misarticulations identified. For the classroom teachers, the two films were not significantly different in the number of misarticulations falsely identified. However, the experienced clinicians and the graduating seniors made significantly more false identifications of misarticulations on Film B than on Film A.

When the correct identification of misarticulations were combined for phrases, isolations, and trios, all three groups favored Film A (significant beyond 1 per cent level). Film A was also significantly better in terms of total correct responses when scores for sounds in isolation, phrases, and trios were combined.

Hypothesis Five. There are no significant differences among the three groups in their identification of specific sounds on Film A. The misarticulations of the 20 individual consonant sounds were studied. In Table 12, the number of occurrences of each sound represented as a percentage is presented. The group means are expressed in percentages and listed according to the size of the overall percentage. For example, the [ʃ] sound was correctly identified as a misarticulation 88.1 per cent of the time by members of Group I and [m] was identified correctly 14 per cent of the time by Group I.

TABLE 12. GROUP MEANS DIVIDED BY NUMBER OF OCCURRENCES AS A PERCENTAGE AND RANKINGS OF SOUNDS ACCORDING TO SIZE OF PERCENTAGE OF CORRECT IDENTIFICATION.

Sound	Groups 1 %	Rank	2 %	Rank	3 %	Rank	Total %	Rank
ʃ	88.1	1	92.7	1	83.1	1	88.0	1
tʃ	81.1	2	84.4	2	73.3	2	79.6	2
r	79.7	3	79.5	3	67.4	3	75.5	3
s	70.8	5	72.4	5	62.3	4	68.5	4
z	68.4	6	73.4	4	55.8	7	65.7	5
dʒ	65.6	7	70.6	6	60.7	5	65.6	6
θ ð	71.0	4	68.2	7	49.4	8	62.9	7
d	64.3	8	62.0	8	56.9	6	61.0	8
f	61.3	9	57.3	10	46.0	9	54.9	9
g	54.0	11	52.8	11	37.6	10	48.1	10
k	54.0	10	59.0	9	30.0	13	47.7	11
v	48.4	12	52.0	12	30.8	12	43.7	12
b	32.0	14	45.0	13	34.0	11	37.0	13
t	32.0	15	36.7	15	24.7	15	31.1	14
l	29.7	16	38.6	14	21.1	16	29.8	15
hw	38.9	13	20.0	18	18.4	18	25.8	16
n	27.0	17	22.0	16	26.0	14	25.0	17
ŋ	17.0	18	14.0	19	20.0	17	17.0	18
p	14.0	19	22.0	17	6.0	20	14.0	19
m	14.0	20	10.0	20	12.0	19	12.0	20

Ranks of sounds according to correct identification are also given. From an examination of the table, it would appear that [ʃ, tʃ, r] were ranked highest by members of all three groups.

In Table 13, the means for correct identification of misarticulations and the F for testing the differences among the groups are presented. Groups I and II (experienced clinicians and graduating seniors identified correctly significantly more misarticulations of [s, l, θ, ð, hw, tʃ, z, ʃ , g, k, v, r] than the classroom teachers did (significant beyond the 1 per cent level). The [f] sound was also differentiated by the groups with Groups I and II identifying significantly more misarticulations correctly than Group III (significant beyond 1 per cent level).

The following sounds were not significantly different in terms of correct identification of misarticulations by the three groups: [d, dʒ , ŋ, p, n, b, t, m].

The Audiovisual Test

Validity of the Test. Validity of the test refers to the degree of accuracy with which it does measure what it purports to measure. Basically, the validity of the test is the question of prediction or estimation of some "true" ability. The conventional method of determining validity of a test is to administer the new test together with a generally accepted standardized test of similar content to a sample of subjects and then correlate the two sets of results. If the new test correlates reasonably high with the accepted test, evidence of validity is usually accepted.

TABLE 13. IDENTIFICATION OF MISARTICULATIONS BY SOUNDS ON FILM A

Sound	Number of Occurrences	Mean Number of Correctly Identified Misarticulations			Total	F
		Group 1	Group 2	Group 3		
s	25	17.700	18.100	15.580	17.127	7.11^{**}
l	7	2.080	2.700	1.480	2.087	7.84^{**}
θ, ð	28	19.880	19.100	13.820	17.600	26.08^{**}
hw	9	3.500	1.800	1.660	2.320	7.37^{**}
tʃ	19	15.400	16.040	13.920	15.120	7.90^{**}
z	10	6.840	7.340	5.580	6.573	13.34^{**}
d	7	4.500	4.340	3.980	4.273	1.01
ʃ	18	15.860	16.680	14.960	15.833	7.23^{**}
g	5	2.700	2.640	1.880	2.407	5.27^{**}
dʒ	14	9.180	9.880	8.500	9.187	2.24
k	4	2.160	2.360	1.200	1.907	11.76^{**}
ŋ	2	0.340	0.280	0.400	0.340	0.48
p	1	0.140	0.220	0.060	0.140	2.70
n	2	0.540	0.440	0.520	0.500	0.37
v	5	2.420	2.600	1.540	2.187	8.25^{**}
f	3	1.840	1.720	1.380	1.647	3.78^{*}
b	2	0.640	0.900	0.680	0.740	2.29
r	13	10.360	10.340	8.760	9.820	6.06^{**}
t	3	0.960	1.100	0.740	0.933	2.75
m	1	0.140	0.100	0.120	0.120	0.19

*Significant F at 5 per cent level > 3.05, df 2/147.

**Significant F at 1 per cent level > 4.70, df 2/147.

In the recognition of misarticulations, there is no standardized test with which the new audiovisual test could be correlated. Consequently, the conventional method for ascertaining validity could not be used.

The method of extreme groups was used in this study to establish validity of the test. The experienced clinicians or criterion group would be expected to do better than the inexperienced examiners or the classroom teachers without speech training. The _t_ test was applied to ascertain if the criterion group which was expected to have "true" ability would act differently from the non-criterion group. According to the analysis of the data (Table 14), the experienced clinicians were consistently and significantly better than the classroom teachers in the identification of the misarticulations. Such evidence is accepted by the investigator for the validity of the audiovisual test.

Reliability of the Test. By reliability is meant the consistency of accuracy with which the test measures what it purports to measure. According to the first procedure, internal consistency of the Audiovisual Film A was ascertained through the use of the split-half method (split-twelfths). Correlations were determined among twelve parts of the test for correctly identified misarticulations. The correlations are found in Tables 15, 16, and 17. In Table 18, the correlations between the types of responses are indicated. It would appear from the correlations between the various types of responses for correctly identified misarticulations that internal consistency of the test was adequate.

TABLE 14. PERCENTAGE OF CORRECT RESPONSES FOR FILMS A AND B (AUDIOVISUAL)[*]

	Isolations (276)		Phrases (138)		Twos (144)		Total (558)	
	Film A	Film B	Film A	Film B	Film A	Film B	Film A	Film B
Group I (Experienced)	84.7	83.2	84.0	84.5	79.6	79.0	83.2	82.5
Group II (Seniors Majoring in Speech and Hearing)	85.8	83.4	85.7	85.0	79.4	79.5	83.9	83.0
Group III (Inexperienced judges classroom teachers)	80.4	79.6	80.0	83.2	73.4	75.8	78.5	79.5

[*] Data obtained from Tables 7 and 8.

TABLE 15. CORRELATIONS AMONG TWELVE PARTS ON CORRECTLY IDENTIFIED MISARTICULATIONS (Form A)

	I 1-2	V 13-14	IX 25-26	II 4-5	IV 10-11	VI 16-17	VIII 22-23	X 28-29	XII 34-35	III 7-8	VII 19-20	XI 31-32
I		.42	.35	.19	.35	.56	.22	.43	.53	.48	.44	.32
		.35	.52	.61	.61	.47	.39	.50	.58	.72	.51	.67
		.63	.54	.59	.31	.38	.51	.48	.51	.65	.40	.41
V			.47	.20	.16	.40	.66	.37	.28	.35	.36	.35
			.51	.31	.32	.44	.64	.33	.36	.39	.49	.48
			.52	.46	.29	.29	.74	.51	.40	.56	.50	.35
IX				.48	.10	.37	.49	.33	.46	.43	.50	.49
				.53	.40	.48	.30	.55	.38	.37	.34	.61
				.65	.37	.57	.50	.55	.66	.65	.51	.50
II					.01	.26	.18	.29	.25	.30	.27	.37
					.51	.37	.26	.55	.47	.61	.31	.44
					.38	.42	.37	.43	.55	.61	.53	.38
IV						.22	.15	.29	.47	.44	.28	.25
						.19	.35	.36	.47	.41	.29	.41
						.49	.17	.37	.46	.52	.45	.27
VI							.21	.39	.60	.64	.32	.50
							.46	.54	.46	.46	.28	.68
							.28	.54	.70	.66	.45	.58
VIII								.21	.18	.21	.21	.31
								.36	.32	.42	.41	.38
								.36	.44	.42	.44	.36
X									.55	.39	.50	.43
									.60	.34	.36	.59
									.61	.50	.71	.23
XII										.69	.46	.50
										.58	.33	.68
										.70	.63	.64
III											.46	.60
											.38	.56
											.58	.63
VII												.55
												.45
												.37
XI												

TABLE 16. CORRELATIONS AMONG TWELVE PARTS ON INCORRECTLY IDENTIFIED AS MISARTICULATIONS (Form A)

	I 1-2	V 13-14	IX 25-26	II 4-5	IV 10-11	VI 16-17	VIII 22-23	X 28-29	XII 34-35	III 7-8	VII 19-20	XI 31-32
I												
V	.63 .32 .48											
IX	.60 .15 .45	.60 .53 .38										
II	.76 .87 .45	.60 .28 .53	.80 .03 .67									
IV	.72 .89 .35	.50 .31 .69	.54 .06 .52	.75 .91 .72								
VI	.48 .09 .47	.31 .31 .46	.39 .36 .38	.45 .02 .47	.43 .08 .55							
VIII	.49 .07 .50	.63 .41 .66	.83 .53 .46	.72 -.06 .52	.51 .01 .61	.36 .39 .52						
X	.42 .05 .54	.49 .33 .56	.54 .47 .62	.48 -.10 .52	.36 -.03 .49	.50 .43 .61	.51 .41 .63					
XII	.52 .25 .48	.43 .31 .24	.40 .43 .56	.47 .16 .38	.50 .19 .36	.54 .38 .52	.42 .40 .36	.61 .31 .57				
III	.69 .85 .26	.63 .27 .37	.43 .09 .04	.63 .91 .33	.58 .93 .50	.47 .04 .52	.42 -.04 .32	.43 -.05 .46	.50 .20 .18			
VII	.56 .31 .23	.48 .43 .60	.50 .51 .63	.47 .06 .65	.48 .18 .65	.47 .36 .51	.47 .48 .53	.67 .42 .75	.57 .21 .43	.36 .12 .29		
XI	.45 .18 .50	.42 .43 .33	.37 .53 .33	.37 .01 .18	.31 .15 .35	.56 .56 .55	.38 .58 .51	.67 .62 .60	.68 .41 .45	.41 .15 .44	.59 .46 .35	

TABLE 17. CORRELATIONS AMONG TWELVE PARTS ON CORRECT RESPONSES (Form A)

	I 3	V 15	IX 27	II 6	IV 12	VI 18	VIII 24	X 30	XII 11	III 9	VII 21	XI 33
I		.32 .50 .14	.35 .19 .21	.59 .73 .41.	.47 .73 .27	.52 .31 .29	.12 .25 .03	.18 -.21 .26	.43 .42 .18	.48 .78 .20	.38 .10 -.16	.23 .12 .15
V			.09 .20 .06	.04 .57 .12	.00 .58 .24	.26 .25 .14	.38 .16 .45	.13 -.11 .05	.05 .12 .13	.38 .39 .27	.14 .13 .29	.05 -.04 .15
IX				.53 .21 .48	.21 .19 .41	.07 .18 .32	.33 .04 .17	.14 .21 .16	.11 .24 .40	.14 .09 .30	.05 -.11 .28	-.01 .16 .21
II					.47 .84 .44	.28 .16 .24	.23 .18 .00	.33 -.05 .02	.20 .24 .39	.17 .63 .37	.28 .10 .28	.03 .09 .20
IV						.18 .23 .39	.20 .24 .19	.10 -.07 .16	.42 .21 .25	.36 .55 .22	.23 .12 .44	.03 .21 .39
VI							.20 .35 .25	.08 .00 .47	.44 .35 .50	.41 .31 .54	.16 -.15 .16	.10 .25 .28
VIII								.22 -.02 -.02	.07 .31 .16	.14 .28 .17	.15 .17 .05	.04 .08 .30
X									.13 .19 .14	-.05 -.29 .17	.20 -.15 .27	.02 .37 .20
XII										.51 .47 .58	.30 -.16 .10	.16 .30 .20
III											.15 .10 .16	.01 .01 .18
VII												.45 -.02 .04
XI												

TABLE 18. CORRELATION BETWEEN TYPES OF RESPONSES (Form A)

		Correctly Identified			Incorrectly Identified			Total Correct		
		Phrases 1	Isolation 4	Trio 7	Phrases 2	Isolation 5	Trio 8	Phrases 3	Isolation 6	Trio Y
Correctly Identified	Phrases		.724	.622	.553	.604	.543	.291	-.079	.054
			.790	.804	.477	.282	.599	.579	.387	.274
			.762	.712	.628	.518	.517	.486	.342	.297
	Isolation			.762	.420	.473	.596	.188	.284	.154
				.796	.451	.357	.553	.389	.490	.321
				.833	.567	.580	.566	.270	.553	.393
	Trio				.425	.579	.666	.087	-.021	.348
					-.389	.441	.673	.320	.244	.428
					.521	.538	.651	.262	.404	.504
Incorrectly Identified	Phrases					.850	.682	-.636	-.589	.352
						.815	.754	-.440	-.389	-.246
						.811	.651	-.376	-.180	-.092
	Isolation						.791	-.416	-.710	-.308
							.753	-.468	-.639	-.368
							.807	-.293	-.359	-.248
	Trio							-.280	-.385	-.468
								-.087	-.247	-.380
								-.114	-.177	-.327
Total Correct	Phrases								.604	.455
									.756	.508
									.610	.456
	Isolation									.458
										.607
										.704
	Trio									

The second procedure used to establish reliability was by means of a parallel form of the test. Forms A and B (audiovisual) were administered on the same day to all subjects. Since no significant differences occurred for any of the three groups in the correct identification of misarticulations, it is assumed that the reliability of the test is satisfactory when applied to identification of sounds in isolated words. Detailed discussion of the equivalence of the two films occurs in Chapter III.

In Table 19, the means and standard deviations of the experienced or criterion group are given.

Summary

In this chapter, the analysis and the results of the study are given. Five experimental questions concerned with the film tests were evaluated. The validity and reliability of the test are also presented. In the next chapter, the summary and conclusions will be presented.

TABLE 19. MEANS AND STANDARD DEVIATIONS FOR EXPERIENCED CLINICIANS FOR FILMS A AND B

(AUDIOVISUAL)*

	MEANS			STANDARD DEVIATIONS		
	Correctly Identified	Incorrectly Identified As Misarticulations	Correct Responses	Correct	Incorrect	Total Correct Responses
Film A						
Isolations	64.8	13.0	47.6	8.32	9.75	9.55
Phrases	25.0	9.0	15.9	4.82	6.15	5.10
Trios	38.6	15.0	23.0	6.15	6.81	6.03
Film B						
Isolations	60.0	23.5	36.7	8.79	12.50	9.78
Phrases	23.6	12.0	11.0	3.97	6.95	5.93
Trios	40.8	15.0	45.7	6.57	7.11	6.04

*Data based on Tables VII and VIII.

CHAPTER IV

SUMMARY AND CONCLUSIONS

The purpose of this study was to prepare an audiovisual test which would be valid and reliable in determining the reliability of speech clinicians and researchers in the recognition of phonetic errors. Five experimental questions were posed:

1. Are experienced clinicians more effective than classroom teachers in the identification of phonetic errors?

2. Is a misarticulation easier to identify in isolated words, phrases, or "trios" of words?

3. Does the identification of misarticulations vary when responses to audio and audiovisual representations of sounds are compared?

4. Do Forms A and B of the audiovisual films differ in the identification of misarticulations?

5. Does the identification of specific sounds discriminate among the groups?

Six children responded to 23 words represented by pictures as isolated words, and as part of a phrase and "trio." A total of 558 sounds were presented as stimuli to three groups of judges: Group I - 50 experienced clinicians; Group II - 50 graduating senior majors in speech and hearing therapy; and Group III - 50 classroom teachers.

Alternate forms of the audiovisual film were prepared with the same six children. The same procedure was used except that a different set of 23 words was used.

The experimental procedure provided for three showings of the films to each group of subjects: Audiovisual Film A, Audio (only), Film A, and Audiovisual Film B. Each judge marked through circled sounds on a score sheet the item which was thought to be misarticulated. The answers were scored according to empirically derived right answers.

The data were tabulated and treated statistically by analysis of variance, critical difference, t test for paired measures, and intercorrelations. Means and standard deviations were also ascertained for responses to each category of the tests.

Summary of the Results

1. Experienced clinicians and graduating senior majors in speech and hearing therapy acted approximately alike but differently from classroom teachers in the identification of misarticulations. The classroom teachers also falsely identified more misarticulations than either of the other two groups.

2. Identification of misarticulations in isolated words was better than in phrases for judges in all three groups. For the experienced clinicians and graduating seniors, accurate identification of misarticulations in "trios" was better than in phrases but no significant differences occurred between judgments of isolated words and "trios." The classroom teachers, however, did significantly better in judging sounds in isolated words than in "trios."

3. The three groups of judges did not act differently in their responses to audiovisual and audio representations of sounds (Film A). All three groups were significantly better in the identification of misarticulations in response to stimuli by audiovisual means than by audio only. The classroom teachers falsely identified more misarticulations by the audiovisual than by audio only method.

4. The alternate forms of the audiovisual film (Films A and B) were not significantly different for any of the three groups in the accurate identification of misarticulations when sounds occur in isolated words. When the correct identification of misarticulations were combined for phrases, isolation, and "trios," all three groups favored Film A.

5. The experienced clinicians and graduating senior majors in speech and hearing identified correctly more misarticulations of the following sounds [s, l, θ, ð, f, hw, tʃ , z, ʃ , g, k, v, r] than did the classroom teachers. These sounds [d, dʒ, ŋ, p, n, b, t, m] were not differentiated by the groups.

Both forms of the Audiovisual Test for the Identification of Misarticulations are considered valid as the experienced and trained clinicians did consistently and significantly better than the classroom teachers did. The tests are also reliable since no differences occurred between the two forms in terms of identification of sounds in isolated words and the internal consistency of identification of misarticulations appeared adequate.

The two 22-minute technicolor audiovisual films (Films A and B) are available for future use by clinicians and researchers.

Conclusions

As the result of this research, it would appear that future clinicians and researchers could determine individual reliability of judgments of misarticulations in the speech of children. Such a procedure will eliminate the usual necessity for panels of judges. The practicing clinician who has established his reliability will be able to use numerical scales and tests with confidence. Procedures for determining individual reliability are found in Appendix F.

The audiovisual tests may be used with clinicians in training. The test could be given before and after training to ascertain the effect of clinical practice or a particular course on the judgments of misarticulations.

With two forms of the audiovisual test available, further research is anticipated. Such questions as the following are now being studied:

1. Relationship of auditory discrimination to identification of misarticulations.
2. Recognition of misarticulations without written clues.
3. Relationship of training in phonetic transcription and identification of misarticulation.
4. Effect of parent education on recognition of misarticulations.
5. Effect of student teaching in speech and hearing on identification or misarticulations.

APPENDIX A

CRITERION GROUP (Group I)

50 Experienced Clinicians (Over 5 years of experience)

Antonio, Sister Mary Ludden
Director of Speech and Hearing Therapy
Professor of Speech
St. Xavier College
Chicago, Illinois

Baker, Donald
Kent State University
Kent, Ohio

Barrick, Nancy
777 Country Club Drive
Newark, Ohio

Bell, Dorothy
Director, Speech Clinic
Texas Christian University
Ft. Worth, Texas

Berger, Kenneth
Kent State University
Kent, Ohio

Bernstein, Gertrude
Hearing and Vision Consultant
State Department of Health
Columbus, Ohio

Brown, Mrs. Loretta
Speech Therapist
Medical College of Alabama
1830 Abbott Avenue
Anniston, Alabama

APPENDIX A (continued)

Black, Mrs. Esther K.
Associate Professor of Speech
Ashland College
Ashland, Ohio

Bright, Margaret
Speech Therapist
Columbus Public Schools
Columbus, Ohio

Curtiss, Agnes
Speech Therapist
Columbus Public Schools
Columbus, Ohio

Daniel, Lynn E.
Coordination, Adult Speech Rehabilitation Program
Siskin Rehabilitation Center
Chattanooga, Tennessee

Duquay, Marshall
Chief Speech and Hearing Clinician
Roswell Park Memorial Institute
Buffalo, New York

De Wees, Mrs. Barbara
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Reynoldsburg, Ohio

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Harry Jersig Speech and Hearing Center
San Antonio, Texas

Everett, Mrs. Olga
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La Follette, A. C.
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APPENDIX A (continued)

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Department of Surgery
Division of Otolaryngology
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Denver, Colorado

Goff, Sheila Morrison
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Gottsleben, Robert H.
Senior Clinician
Aphasia Institute
Stanford University
Palo Alto, California

Greenberg, Frederick R.
Head, Department of Speech Pathology
Kenny Rehabilitation Institute
Minneapolis, Minnesota

Gregory, Mrs. Pauline G.
Director, Speech and Hearing Clinic
Muscatatuck State School
North Vernon, Indiana

Harrison, Peggy
Director, Speech and Hearing Clinic
Southern Methodist University
Dallas, Texas

Hatton, Margaret
Assistant Professor of Speech
Clinical Supervisor
Rock Island, Illinois

Hudson, Atwood
Speech Pathologist
V.A. Hospital
Houston, Texas

Hutchinson, Edward
Kent State University
Kent, Ohio

APPENDIX A (continued)

Jones, Ralph W.
Director, Speech and Hearing Services
Public Schools
Ithaca, New York

Katz, Mrs. Jean
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William Roche Hospital
Toledo, Ohio

King, Rella
Speech and Hearing Clinic
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Kent, Ohio

Long, Ruth
Speech Therapist
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Columbus, Ohio

Lucy, Sister Mary
Director of Department of Speech Therapy
St. Vincent Hospital
Erie, Pennsylvania

MacLearie, Elizabeth C.
Educational Specialist
State Department of Education
Columbus, Ohio

Messick, Mrs. Anna M.
Speech Pathologist
Parsons Board of Education
Parsons, Kansas

Ottenfeld, Mrs. Helen H.
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Johnson City, Tennessee

Pettit, John M.
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APPENDIX A (continued)

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Director of Speech and Hearing Clinic
Alabama College
Montevallo, Alabama

O'Reilly, Patricia
Graduate Student
Ohio State University
Columbus, Ohio

Rush, Mary Lou
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Columbus, Ohio

Smith, Kathleen
Speech Therapist
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Columbus, Ohio

Szymoniak, Mrs. Elaine
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Simonson, Josephine
700 Seward Avenue
Detroit, Michigan

Schaefer, Mrs. Pauline P.
Assistant Professor - Supervising Teacher
Northern Illinois University
De Kalb, Illinois

Sayre, Richard
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Columbus, Ohio

Seitz, Mrs. Gail M.
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International Institute
Detroit, Michigan

APPENDIX A (continued)

Smith, Thomas C.
Speech Therapist
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Madison, Wisconsin

Schlanger, Mrs. Phoebe
Supervisor - Student Teachers in Speech and Hearing
Ohio State University
Columbus, Ohio

Steur, Betty
Speech Therapist
Columbus, Ohio

Warden, Leona W.
Speech and Hearing Therapist
Harrisburg State Hospital
Harrisburg, Pennsylvania

White, Doris
Speech and Hearing Therapist
Columbus Public Schools
Columbus, Ohio

Williams, Don
Speech Therapist
Mt. Vernon, Ohio

APPENDIX B

CHILDREN PARTICIPATING AS SUBJECTS IN THE FILMS

1. Butler, David
   Father's name: Woodrow Butler
   1720 Richmond Road
   Columbus 23, Ohio

2. Morrison, Richard Lee
   Father's name: Edward P. Morrison
   3899 Haughn Road
   Grove City, Ohio

3. Ruoff, Mike
   Father's name: Earl Ruoff
   3332 Hoover Road
   Grove City, Ohio

4. Salzgaber, James
   Father's name: Everett Salzgaber
   1765 Brown Road
   Columbus 23, Ohio

5. Wagner, Robin
   Father's name: Richard A. Wagner
   2334 Shrewsbury Road
   Columbus 21, Ohio

6. Wemlinger, Tim
   Father's name: William S. Wemlinger
   116 Gunderman Avenue
   Grove City, Ohio

APPENDIX C

FORMS FOR FILMS A AND B

THE OHIO STATE UNIVERSITY TEST FOR IDENTIFYING MISARTICULATIONS

Name ______________________

___ ___ ___ ___ ___ ___
Gr # # Film A Av

Test and Drill Sheet: Draw a line through the circled sounds in those words in which you identify a misarticulation (omissions, substitutions, or distortions).

Film List A

I. Phrases	II. Isolation	III. Trios
1. where's your (r) i (ng)	1. (r) i (ng)	1. (p) i (g) (l) ea (f) (b) oo (k)
2. catch a (m) ou (s) e	2. (m) ou (s) e	2. (w) e (b) (n) o (se) (s) moo (th)
3. in a (j) ai (l)	3. (j) ai (l)	3. (r) i (ng) (g) u (n) (j) ai (l)
4. brush your (t) ee (th)	4. (t) ee (th)	4. (t) ee (th) (c) a (ge) (th) u (m) b
5. close the (d) oo (r)	5. (d) oo (r)	5. (h) an (d) (v) i (n) e (ch) ur (ch)
6. open the (c) a (ge)	6. (c) a (ge)	6. (wh) i (t) e (f) i (sh) (th) i (s)
7. snow is (wh) i (t) e	7. (wh) i (t) e	7. (d) oo (r) (m) ou (s) e (z) i (p)
8. at a (ch) ur (ch)	8. (ch) ur (ch)	8. (sh) a (v) e (b) oo (k) (y) ar (n)
9. blow your (n) o (se)	9. (n) o (se)	
10. raise your (h) an (d)	10. (h) an (d)	
11. where's your (th) u m (b)	11. (th) u (m) b	
12. give me (th) i (s)	12. (th) i (s)	
13. climb a (v) i (n) e	13. (v) i (n) e	
14. catch a (f) i (sh)	14. (f) i (sh)	
15. shoot the (g) u (n)	15. (g) u (n)	
16. need a (sh) a (v) e	16. (sh) a (v) e	
17. pull the (y) ar (n)	17. (y) ar (n)	
18. fur is (s) moo (th)	18. (s) moo (th)	
19. pick a (l) ea (f)	19. (l) ea (f)	
20. spider (w) e (b)	20. (w) e (b)	
21. catch a (p) i (g)	21. (p) i (g)	
22. read a (b) oo (k)	22. (b) oo (k)	
23. coats we (z) i (p)	23. (z) i (p)	

Film List A (continued)

Name ______________________

IV. Isolation

1. leaf
2. web
3. pig
4. book
5. zip
6. ring
7. mouse
8. jail
9. teeth
10. door
11. cage
12. white
13. church
14. nose
15. hand
16. thumb
17. this
18. vine
19. fish
20. gun
21. shave
22. yarn
23. smooth

V. Phrases

1. where's your ring
2. catch a mouse
3. in a jail
4. brush your teeth
5. close the door
6. open the cage
7. snow is white
8. at a church
9. blow your nose
10. raise your hand
11. where's your thumb
12. give me this
13. climb a vine
14. catch a fish
15. shoot the gun
16. need a shave
17. pull the yarn
18. fur is smooth
19. pick a leaf
20. spider web
21. catch a pig
22. read a book
23. coats we zip

VI. Isolation

1. ring
2. mouse
3. smooth
4. jail
5. teeth
6. door
7. cage
8. white
9. church
10. nose
11. hand
12. thumb
13. this
14. fish
15. gun
16. shave
17. yarn
18. leaf
19. vine
20. web
21. book
22. pig
23. zip

Film List A (continued)

Name ______________________

VII. Trios

1. (y)ar(n) (sh)a(v)e (z)i(p)
2. (b)oo(k) (l)ea(f) (p)i(g)
3. (v)i(n)e (n)o(se) (w)e(b)
4. (r)i(ng) (m)ou(s)e (s)moo(th)
5. (j)ai(l) (t)ee(th) (g)u(n)
6. (f)i(sh) (th)i(s) (d)oo(r)
7. (v)i(n)e (ch)ur(ch) (wh)i(t)e
8. (c)a(ge) (th)u(m)b (h)an(d)

VIII. Isolation

1. (r)i(ng)
2. (m)ou(s)e
3. (j)ai(l)
4. (t)ee(th)
5. (d)oo(r)
6. (c)a(ge)
7. (wh)i(t)e
8. (ch)ur(ch)
9. (n)o(se)
10. (h)an(d)
11. (th)u(m)b
12. (th)i(s)
13. (v)i(n)e
14. (f)i(sh)
15. (g)u(n)
16. (sh)a(v)e
17. (y)a r(n)
18. (s)moo(th)
19. (l)ea(f)
20. (w)e(b)
21. (p)i(g)
22. (b)oo(k)
23. (z)i(p)

IX. Phrases

1. where's your (r)i(ng)
2. catch a (m)ou(s)e
3. in a (j)ai(l)
4. brush your (t)ee(th)
5. close the (d)oo(r)
6. open the (c)a(ge)
7. snow is (wh)i(t)e
8. at a (ch)ur(ch)
9. blow your (n)o(se)
10. raise your (h)an(d)
11. where's your (th)u m(b)
12. give me (th)i(s)
13. climb a (v)i(n)e
14. catch a (f)i(sh)
15. shoot the (g)u(n)
16. need a (sh)a(v)e
17. pull the (y)ar(n)
18. fur is (s)moo(th)
19. pick a (l)ea(f)
20. spider (w)e(b)
21. catch a (p)i(g)
22. read a (b)oo(k)
23. coats we (z)i(p)

Film List A (continued)

Name ____________________

X. Isolation

1. thumb
2. cage
3. hand
4. vine
5. church
6. white
7. fish
8. this
9. door
10. teeth
11. jail
12. gun
13. ring
14. smooth
15. nose
16. web
17. book
18. leaf
19. pig
20. yarn
21. shave
22. zip
23. mouse

XI. Trios

1. ring mouse smooth
2. jail teeth door
3. cage white church
4. nose hand thumb
5. leaf vine web
6. book pig zip
7. this fish gun
8. zip shave yarn

XII. Isolation

1. mouse
2. teeth
3. jail
4. gun
5. ring
6. smooth
7. nose
8. web
9. book
10. leaf
11. pig
12. yarn
13. shave
14. zip
15. door
16. this
17. fish
18. white
19. church
20. vine
21. hand
22. thumb
23. cage

THE OHIO STATE UNIVERSITY TEST FOR IDENTIFYING MISARTICULATIONS

Name ____________________

___ ___ ___ ___ ___ ___
Gr # # Film A Av

Test and Drill Sheet: Draw a line through the circled sounds in those words in which you identify a misarticulation (omissions, substitutions, or distortions).

Film List B

I. Phrases

1. what is that
2. hear them sing
3. bake a cake
4. cut in half
5. in the yard
6. pick a rose
7. ocean wave
8. cut a log
9. light a match
10. turn a knob
11. take a chair
12. drink your juice
13. man is thin
14. clean a dish
15. pull a tooth
16. like to bathe
17. turn a page
18. plane goes zoom
19. at the wheel
20. run a sheep
21. milk the goat
22. number five
23. raise your voice

II. Isolation

1. thin
2. dish
3. tooth
4. bathe
5. page
6. zoom
7. wheel
8. sheep
9. goat
10. five
11. voice
12. that
13. sing
14. cake
15. half
16. yard
17. rose
18. wave
19. log
20. match
21. knob
22. chair
23. juice

III. Trios

1. match knob page
2. thin dish bathe
3. cake five wheel
4. juice wave yard
5. rose voice tooth
6. chair half sing
7. zoom that goat
8. log sheep five

Film List B (continued)

IV. Isolation

1. goat
2. five
3. yard
4. rose
5. wave
6. log
7. wheel
8. sheep
9. match
10. that
11. sing
12. cake
13. half
14. tooth
15. voice
16. knob
17. chair
18. juice
19. thin
20. dish
21. bathe
22. page
23. zoom

V. Phrases

1. man is thin
2. clean a dish
3. pull a tooth
4. like to bathe
5. turn a page
6. plane goes zoom
7. at the wheel
8. run a sheep
9. milk the goat
10. number five
11. raise your voice
12. what is that
13. hear them sing
14. bake a cake
15. cut in half
16. in the yard
17. pick a rose
18. ocean wave
19. cut a log
20. light a match
21. turn the knob
22. take a chair
23. drink your juice

VI. Isolation

1. cake
2. sing
3. zoom
4. that
5. goat
6. five
7. wheel
8. juice
9. voice
10. tooth
11. chair
12. half
13. dish
14. bathe
15. knob
16. page
17. thin
18. sheep
19. match
20. log
21. wave
22. yard
23. rose

Film List B (continued)

VII. Trios

1. voice tooth chair
2. half dish bathe
3. knob page thin
4. sheep match log
5. yard rose wave
6. juice wheel five
7. that goat cake
8. zoom sing half

VIII. Isolation

1. that
2. sing
3. cake
4. half
5. yard
6. rose
7. wave
8. log
9. match
10. knob
11. chair
12. juice
13. thin
14. dish
15. tooth
16. bathe
17. page
18. zoom
19. wheel
20. sheep
21. goat
22. five
23. voice

IX. Phrases

1. man is thin
2. clean a dish
3. pull a tooth
4. like to bathe
5. turn a page
6. plane goes zoom
7. at the wheel
8. run a sheep
9. milk the goat
10. number five
11. raise your voice
12. what is that
13. hear them sing
14. bake a cake
15. cut in half
16. in the yard
17. pick a rose
18. ocean wave
19. cut a log
20. light a match
21. turn a knob
22. take a chair
23. drink your juice

Film List B (continued)

Name ____________________

X. Isolation

1. (h)al(f)
2. (s)i(ng)
3. (z)oo(m)
4. (th)a(t)
5. (g)oa(t)
6. (c)a(k)e
7. (f)i(v)e
8. (wh)ee(l)
9. (j)ui(c)e
10. (w)a(v)e
11. (y)ar(d)
12. (r)o(se)
13. (l)o(g)
14. (sh)ee(p)
15. (m)at(ch)
16. k(n)o(b)
17. (p)a(ge)
18. (th)i(n)
19. (d)i(sh)
20. (b)a(th)e
21. (v)oi(c)e
22. (t)oo(th)
23. (ch)ai(r)

XI. Trios

1. (r)o se (y)ar(d) (w)a(v)e
2. (l)o(g) (m)at(ch) (sh)ee(p)
3. (th)i(n) (z)oo(m) (p)a(ge)
4. k(n)o(b) (b)a(th)e (d)i(sh)
5. (h)al(f) (ch)ai(r) (t)oo(th)
6. (v)oi(c)e (j)ui(c)e (wh)ee(l)
7. (f)i(v)e (g)oa(t) (th)a(t)
8. (z)oo(m) (s)i(ng) (c)a(k)e

XII. Isolation

1. (ch)ai(r)
2. (d)oo(r)
3. (t)oo(th)
4. (v)oi(c)e
5. (b)a(th)e
6. (d)i(sh)
7. (th)i(n)
8. (p)a(ge)
9. k(n)o(b)
10. (m)at(ch)
11. (sh)ee(p)
12. (y)ar(d)
13. (r)o(se)
14. (w)a(v)e
15. (j)ui(c)e
16. (wh)ee(l)
17. (f)i(v)e
18. (c)a(k)e
19. (g)oa(t)
20. (th)a(t)
21. (z)oo m
22. (s)i(ng)
23. (h)al(f)

APPENDIX D

CRITERION ANSWER SHEETS

THE OHIO STATE UNIVERSITY TEST FOR IDENTIFYING MISARTICULATIONS

Name ______________________________

___ Gr ___ # ___ # ___ Film ___ A ___ Av

Test and Drill Sheet: Draw a line through the circled sounds in those words in which you identify a misarticulation (omissions, substitutions, or distortions).

Film List A

I. Phrases	II. Isolation	III. Trios
1. where's your ring	1. ~~r~~ing	1. pi~~g~~ ~~l~~ea~~f~~ boo~~k~~
2. catch a mou~~s~~e	2. mouse	2. web no~~se~~ ~~s~~moo~~th~~
3. in a jai~~l~~	3. ~~j~~ail	3. ring gun ~~j~~ai~~l~~
4. brush your tee~~th~~	4. tee~~th~~	4. tee~~th~~ ca~~ge~~ ~~th~~umb
5. close the door	5. door	5. han~~d~~ vine ~~ch~~ur~~ch~~
6. open the cage	6. ca~~ge~~	6. ~~wh~~i~~t~~e fi~~sh~~ ~~th~~i~~s~~
7. snow is ~~wh~~ite	7. ~~wh~~ite	7. doo~~r~~ mou~~s~~e ~~z~~ip
8. at a chur~~ch~~	8. ~~ch~~ur~~ch~~	8. ~~sh~~a~~v~~e boo~~k~~ yarn
9. blow your no~~se~~	9. nose	
10. raise your han~~d~~	10. hand	
11. where's your ~~th~~umb	11. ~~th~~umb	
12. give me ~~th~~i~~s~~	12. this	
13. climb a vine	13. vine	
14. catch a fi~~sh~~	14. fish	
15. shoot the gun	15. gun	
16. need a ~~sh~~a~~v~~e	16. ~~sh~~ave	
17. pull the yarn	17. yarn	
18. fur is ~~s~~moo~~th~~	18. smoo~~th~~	
19. pick a lea~~f~~	19. leaf	
20. spider we~~b~~	20. web	
21. catch a pig	21. pig	
22. read a book	22. book	
23. coats we zip	23. zip	

Film List A (continued)

Name ____________________

IV. Isolation

1. leaf
2. web
3. pig
4. book
5. zip
6. ring
7. mouse
8. jail
9. teeth
10. door
11. cage
12. white
13. church
14. nose
15. hand
16. thumb
17. this
18. vine
19. fish
20. gun
21. shave
22. yarn
23. smooth

V. Phrases

1. where's your ring
2. catch a mouse
3. in a jail
4. brush your teeth
5. close the door
6. open the cage
7. snow is white
8. at a church
9. blow your nose
10. raise your hand
11. where's your thumb
12. give me this
13. climb a vine
14. catch a fish
15. shoot the gun
16. need a shave
17. pull the yarn
18. fur is smooth
19. pick a leaf
20. spider web
21. catch a pig
22. read a book
23. coats we zip

VI. Isolation

1. ring
2. mouse
3. smooth
4. jail
5. teeth
6. door
7. cage
8. white
9. church
10. nose
11. hand
12. thumb
13. this
14. fish
15. gun
16. shave
17. yarn
18. leaf
19. vine
20. web
21. book
22. pig
23. zip

Film List A (continued)

VII. Trios	VIII. Isolation	IX. Phrases
1. yarn shave zip	1. ring	1. where's your ring
2. book leaf pig	2. mouse	2. catch a mouse
3. vine nose web	3. jail	3. in a jail
4. ring mouse smooth	4. teeth	4. brush your teeth
5. jail teeth gun	5. door	5. close the door
6. fish this door	6. cage	6. open the cage
7. vine church white	7. white	7. snow is white
8. cage thumb hand	8. church	8. at a church
	9. nose	9. blow your nose
	10. hand	10. raise your hand
	11. thumb	11. where's your thumb
	12. this	12. give me this
	13. vine	13. climb a vine
	14. fish	14. catch a fish
	15. gun	15. shoot the gun
	16. shave	16. need a shave
	17. yarn	17. pull the yarn
	18. smooth	18. fur is smooth
	19. leaf	19. pick a leaf
	20. web	20. spider web
	21. pig	21. catch a pig
	22. book	22. read a book
	23. zip	23. coats we zip

Film List A (continued)

X. Isolation

1. thumb
2. ca~~ge~~
3. hand
4. vine
5. ~~ch~~ur~~ch~~
6. ~~wh~~ite
7. fi~~sh~~
8. thi~~s~~
9. doo~~r~~
10. teeth
11. jail
12. gun
13. ~~r~~ing
14. ~~s~~moo~~th~~
15. nose
16. web
17. book
18. leaf
19. pig
20. yarn
21. shave
22. zip
23. mou~~s~~e

XI. Trios

1. ~~r~~ing mou~~s~~e smoo~~th~~
2. ~~j~~ail teeth door
3. ca~~ge~~ white ~~ch~~ur~~ch~~
4. nose han~~d~~ ~~th~~umb
5. leaf vine web
6. book pi~~g~~ ~~z~~ip
7. thi~~s~~ fi~~sh~~ ~~g~~un
8. zip ~~sh~~a~~v~~e yarn

XII. Isolation

1. mou~~s~~e
2. tee~~th~~
3. ~~j~~ail
4. gun
5. ring
6. ~~s~~moo~~th~~
7. no~~se~~
8. web
9. boo~~k~~
10. ~~l~~ea~~f~~
11. pi~~g~~
12. yar~~n~~
13. ~~sh~~a~~v~~e
14. zip
15. doo~~r~~
16. ~~th~~i~~s~~
17. fi~~sh~~
18. ~~wh~~ite
19. ~~ch~~ur~~ch~~
20. vine
21. han~~d~~
22. ~~th~~umb
23. ca~~ge~~

THE OHIO STATE UNIVERSITY TEST FOR IDENTIFYING MISARTICULATIONS

Name ______________________

___ Gr ___ # ___ # ___ Film ___ A ___ Av

Test and Drill Sheet: Draw a line through the circled sounds in those words in which you identify a misarticulation (omissions, substitutions, or distortions).

Film List B

I. Phrases	II. Isolation	III. Trios
1. what is ~~th~~at	1. thin	1. mat~~ch~~ knob pa~~ge~~
2. hear them ~~s~~ing	2. dish	2. ~~th~~in di~~sh~~ ba~~th~~e
3. bake a ca~~k~~e	3. tooth	3. ca~~k~~e fi~~v~~e ~~wh~~eel
4. cut in hal~~f~~	4. ba~~th~~e	4. jui~~c~~e wa~~v~~e yar~~d~~
5. in the yard	5. pa~~ge~~	5. ro~~se~~ voi~~c~~e too~~th~~
6. pick a ro~~se~~	6. zoom	6. chai~~r~~ hal~~f~~ ~~s~~ing
7. ocean wave	7. wheel	7. zoo~~m~~ ~~th~~at goa~~t~~
8. cut a lo~~g~~	8. sheep	8. ~~l~~og ~~sh~~eep fi~~v~~e
9. light a mat~~ch~~	9. goat	
10. turn a knob	10. five	
11. take a chair	11. voice	
12. drink your juice	12. that	
13. man is ~~th~~in	13. sing	
14. clean a di~~sh~~	14. ca~~k~~e	
15. pull a too~~th~~	15. half	
16. like to ba~~th~~e	16. yard	
17. turn a page	17. ~~r~~ose	
18. plane goes zoom	18. wave	
19. at the ~~wh~~eel	19. log	
20. run a ~~sh~~eep	20. mat~~ch~~	
21. milk the goat	21. knob	
22. number fi~~v~~e	22. ~~ch~~air	
23. raise your ~~v~~oi~~c~~e	23. juice	

Film List B (Continued)

Name ______________________

	IV. Isolation		V. Phrases		VI. Isolation
1.	g oa t	1.	man is th i n	1.	c a ~~k~~ e
2.	f i ~~v~~ e	2.	clean a d i ~~sh~~	2.	~~s~~ i ng
3.	~~y~~ ar d	3.	pull a t oo th	3.	~~z~~ oo m
4.	~~r~~ o ~~se~~	4.	like to b a th e	4.	th a ~~t~~
5.	w a ~~v~~ e	5.	turn a p a ~~ge~~	5.	g oa ~~t~~
6.	l o g	6.	plane goes ~~z~~ oo m	6.	f i ~~v~~ e
7.	wh ee ~~l~~	7.	at the ~~wh~~ ee l	7.	~~wh~~ ee l
8.	sh ee p	8.	run a ~~sh~~ ee p	8.	~~j~~ ui ~~c~~ e
9.	m at ch	9.	milk the g oa t	9.	v oi c e
10.	~~th~~ a t	10.	number f i v e	10.	t oo ~~th~~
11.	~~s~~ i ng	11.	raise your v oi ~~c~~ e	11.	~~ch~~ ai r
12.	c a k e	12.	what is th a ~~t~~	12.	h al f
13.	h al f	13.	hear them s i ng	13.	d i ~~sh~~
14.	t oo ~~th~~	14.	bake a c a k e	14.	b a ~~th~~ e
15.	~~v~~ oi ~~c~~ e	15.	cut in h al f	15.	k n o b
16.	k n o b	16.	in the y ar d	16.	p a ~~ge~~
17.	ch ai r	17.	pick a r o ~~se~~	17.	th i n
18.	j ui ~~c~~ e	18.	ocean w a ~~v~~ e	18.	~~sh~~ ee p
19.	~~th~~ i n	19.	cut a ~~l~~ o g	19.	m at ~~ch~~
20.	d i ~~sh~~	20.	light a m at ~~ch~~	20.	l o ~~g~~
21.	b a ~~th~~ e	21.	turn the k n o b	21.	w a v e
22.	p a ge	22.	take a ch ai r	22.	y ar d
23.	~~z~~ oo m	23.	drink your j ui c e	23.	~~r~~ o ~~se~~

Film List B

Name ______________________

VII. Trios

1. voice tooth chair
2. half dish bathe
3. knob page thin
4. sheep match log
5. yard rose wave
6. juice wheel five
7. that goat cake
8. zoom sing half

VIII. Isolation

1. that
2. sing
3. cake
4. half
5. yard
6. rose
7. wave
8. log
9. match
10. knob
11. chair
12. juice
13. thin
14. dish
15. tooth
16. bathe
17. page
18. zoom
19. wheel
20. sheep
21. goat
22. five
23. voice

IX. Phrases

1. man is thin
2. clean a dish
3. pull a tooth
4. like to bathe
5. turn a page
6. plane goes zoom
7. at the wheel
8. run a sheep
9. milk the goat
10. number five
11. raise your voice
12. what is that
13. hear them sing
14. bake a cake
15. cut in half
16. in the yard
17. pick a rose
18. ocean wave
19. cut a log
20. light a match
21. turn a knob
22. take a chair
23. drink your juice

Film List B (continued)

Name ______________________

X. Isolation

1. h al f
2. s i ng
3. z oo m
4. th a t
5. g oa t
6. c a k e
7. f i v e
8. wh ee l
9. j ui c e
10. w a v e
11. y ar d
12. r o se
13. l o g
14. sh ee p
15. m at ch
16. k n o b
17. p a ge
18. th i n
19. d i sh
20. b a th e
21. v oi c e
22. t oo th
23. ch ai r

XI. Trios

1. r o se y ar d w a v e
2. l o g m at ch sh ee p
3. th i n z oo m p a ge
4. k n o b b a th e d i sh
5. h al f ch ai r t oo th
6. v oi c e j ui c e wh ee l
7. f i v e g oa t th a t
8. z oo m s i ng c a k e

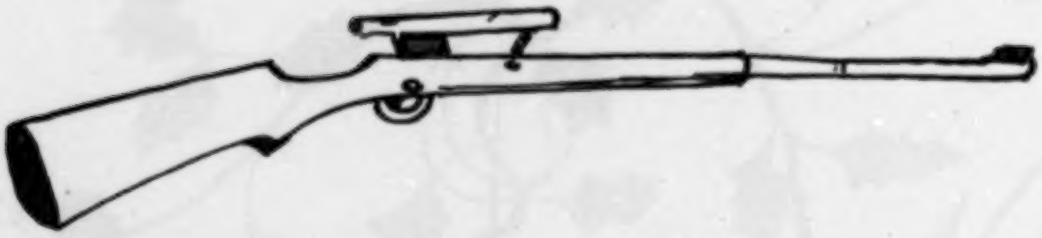
XII. Isolation

1. ch ai r
2. d oo r
3. t oo th
4. v oi c e
5. b a th e
6. d i sh
7. th i n
8. p a ge
9. k n o b
10. m at ch
11. sh ee p
12. y ar d
13. r o se
14. w a v e
15. j ui c e
16. wh ee l
17. f i v e
18. c a k e
19. g oa t
20. th a t
21. z oo m
22. s i ng
23. h al f

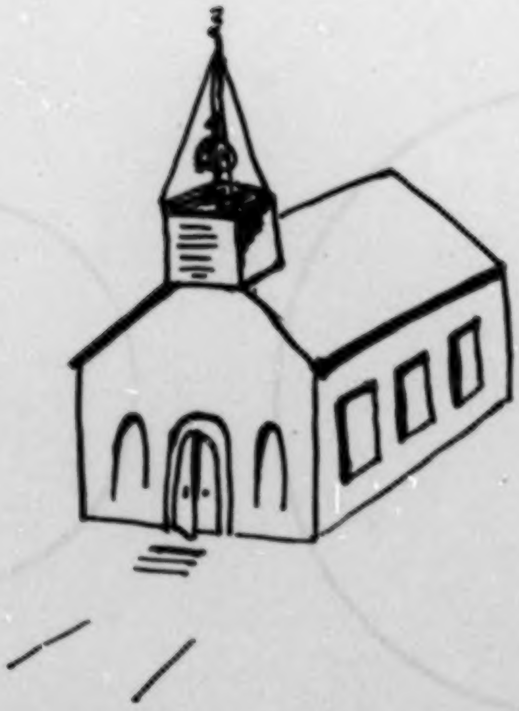
APPENDIX E

PICTURES USED AS STIMULI

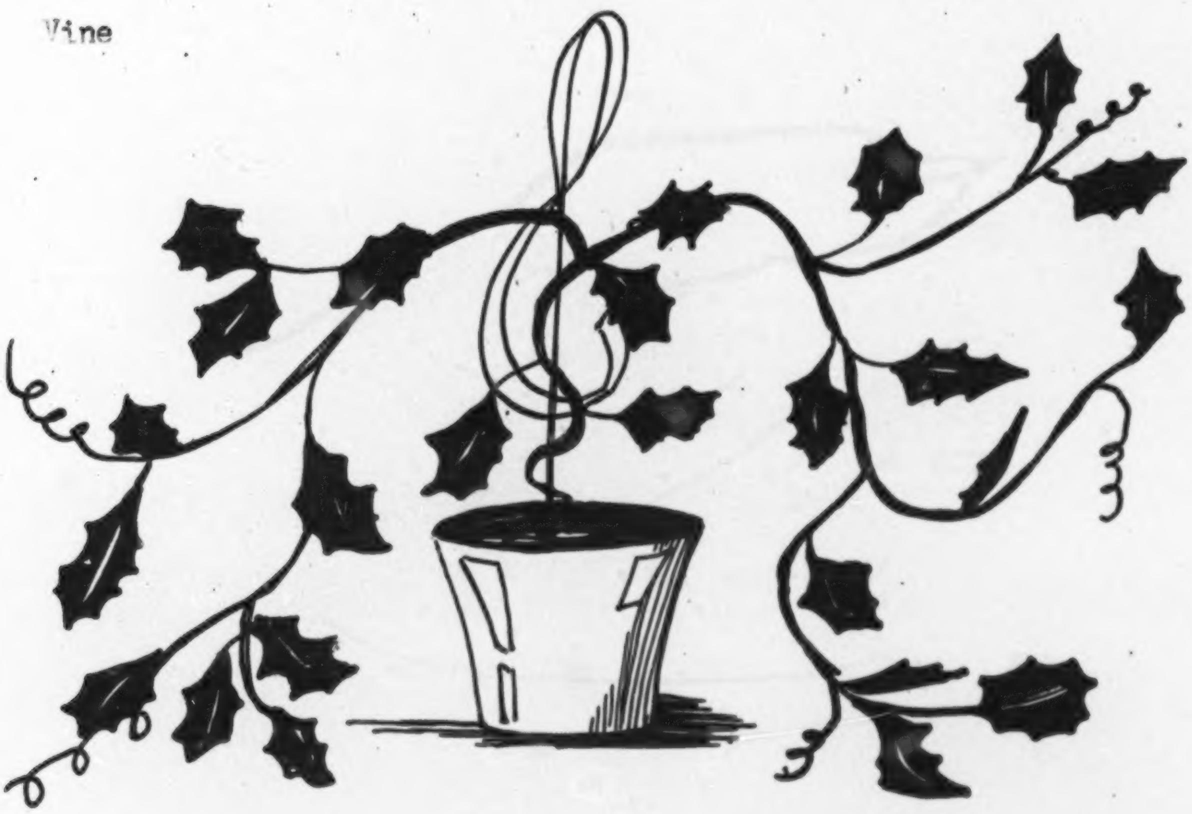
Gun



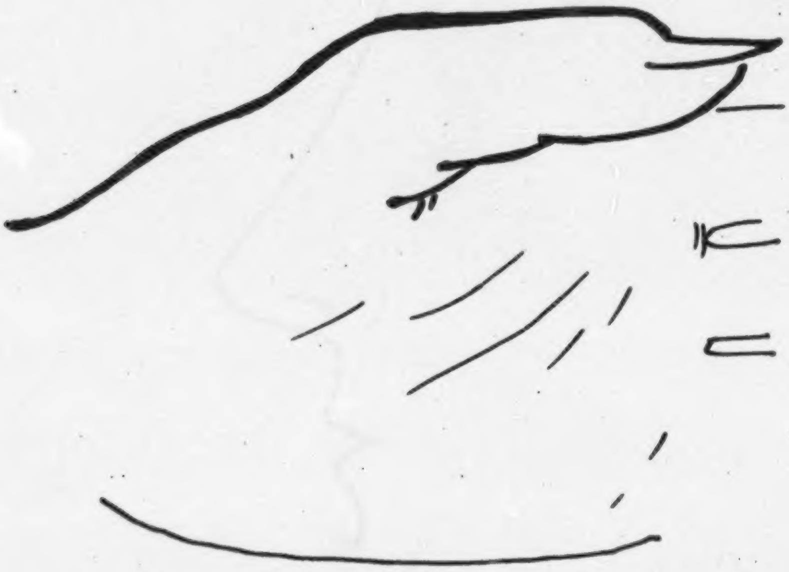
Church



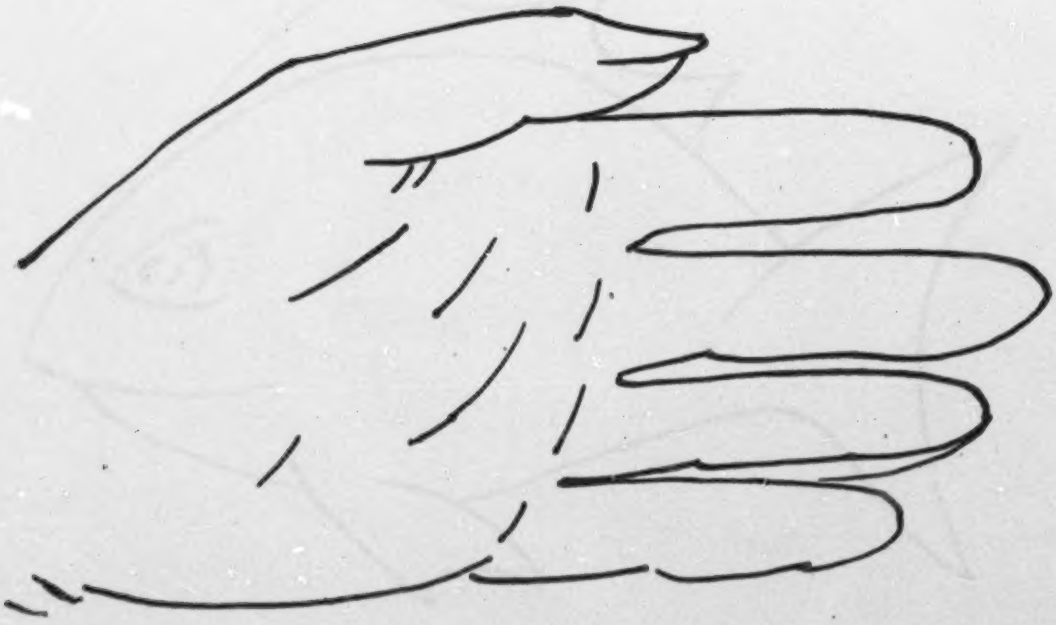
Vine



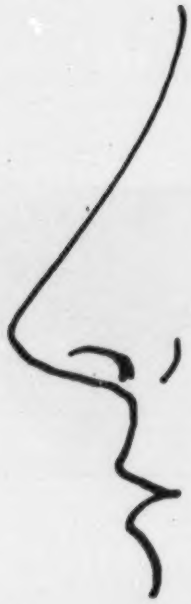
Thumb



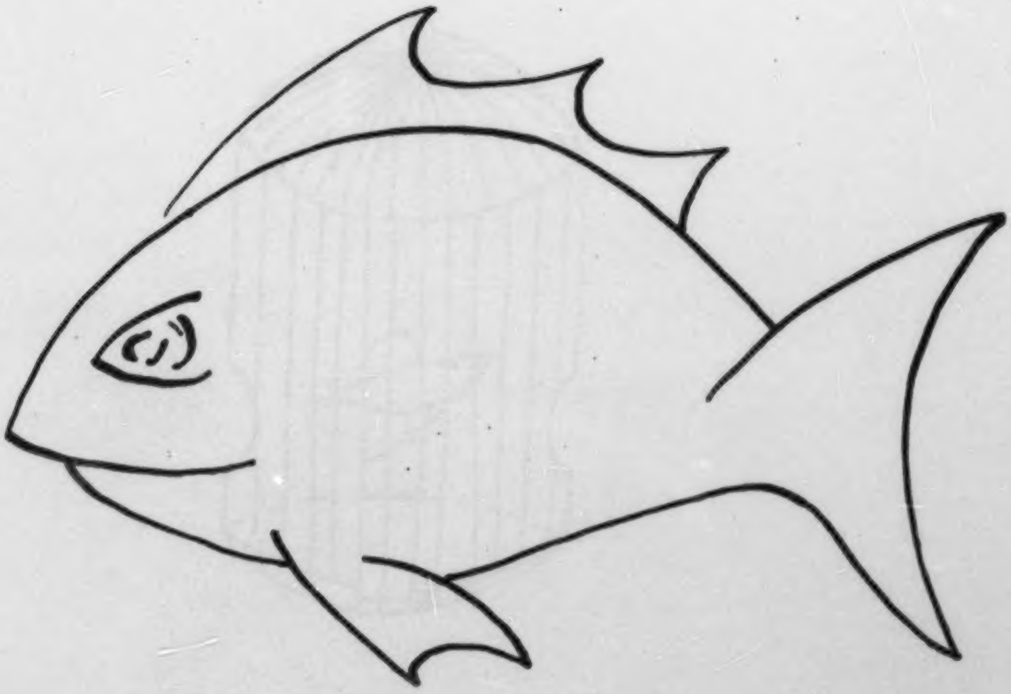
Hand



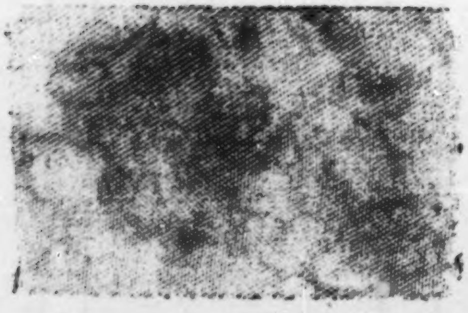
Nose



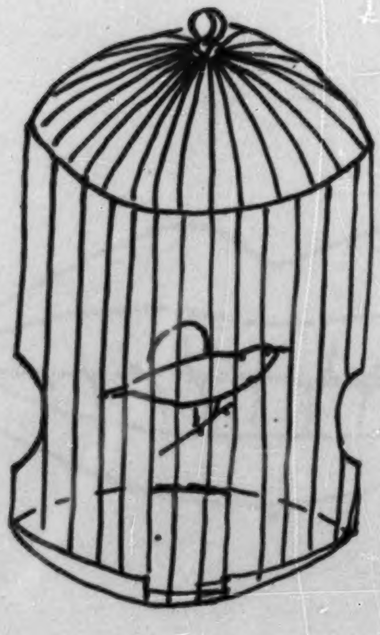
Fish



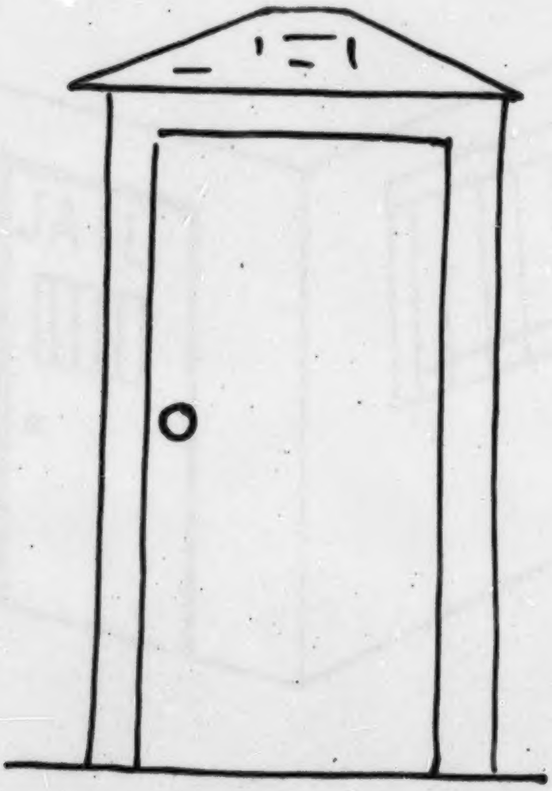
White



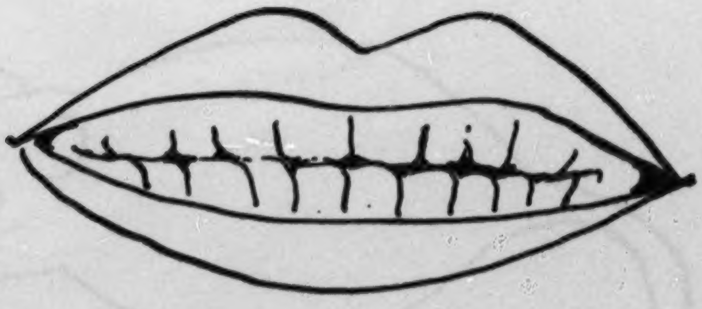
Cage



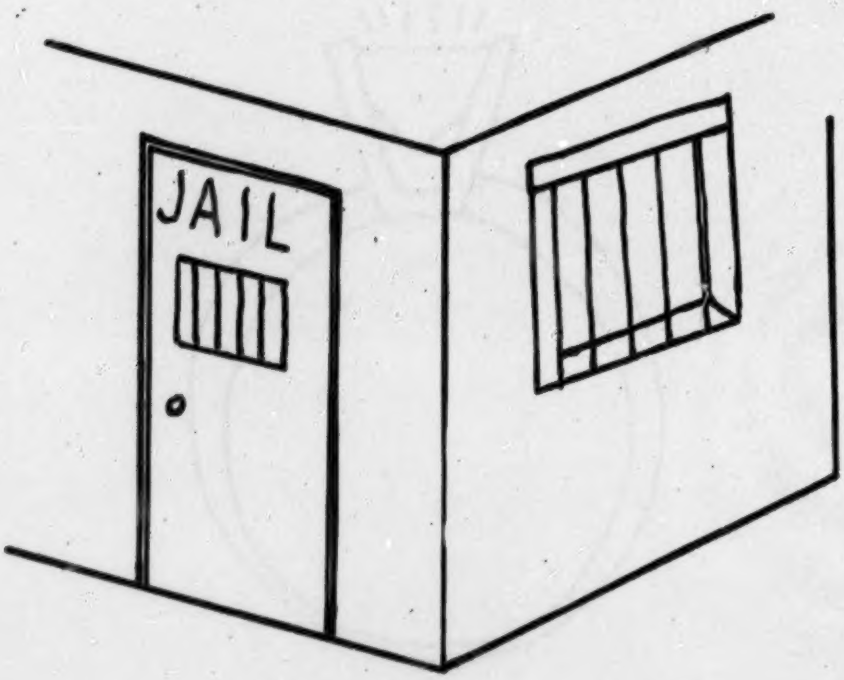
Door



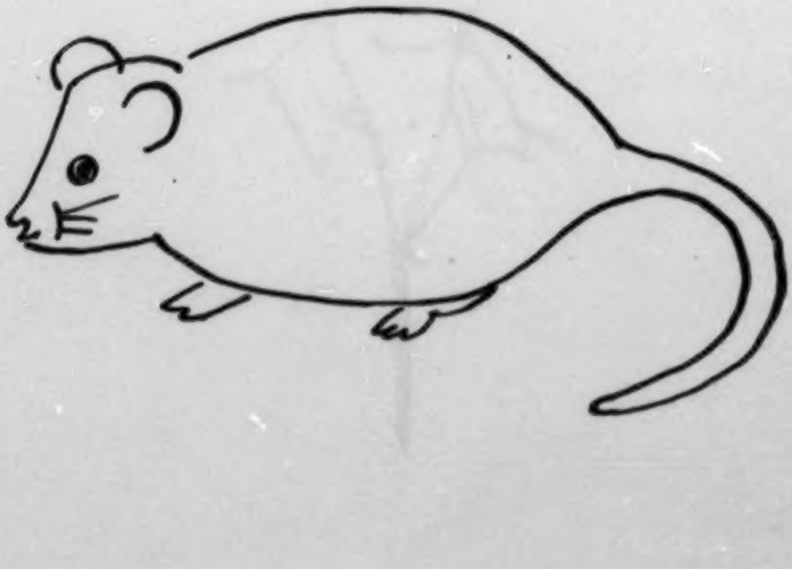
Teeth



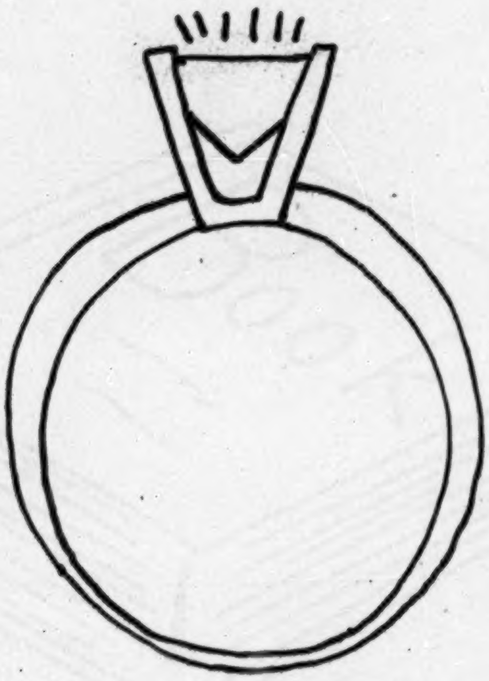
Jail



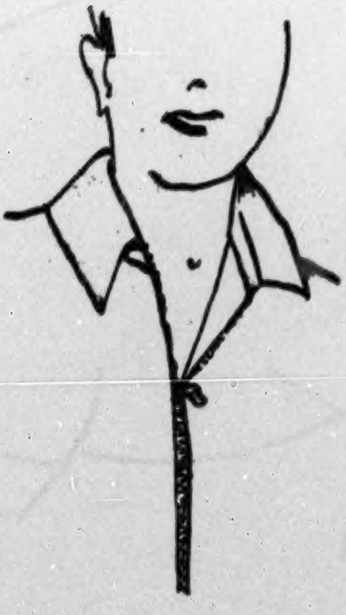
Mouse



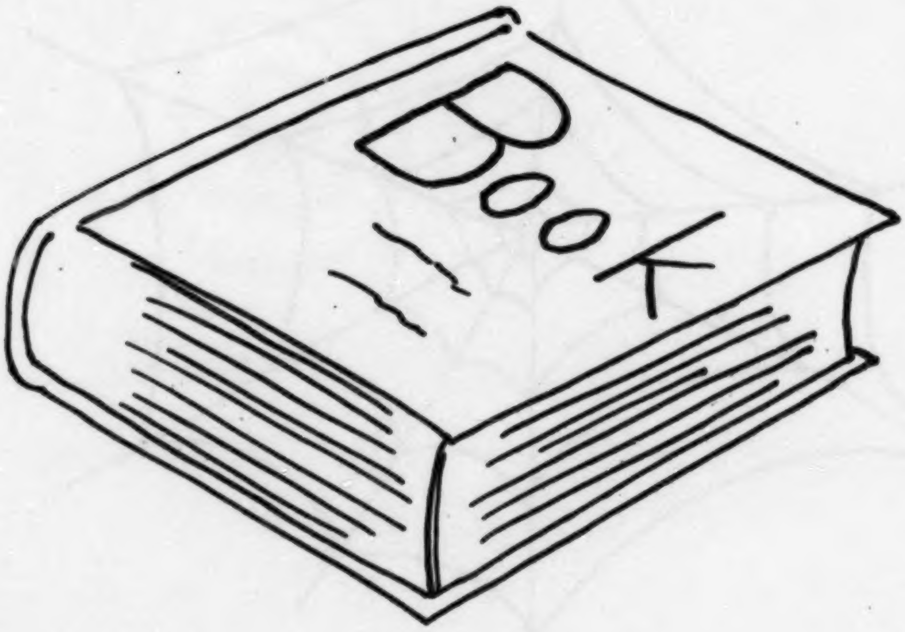
Ring



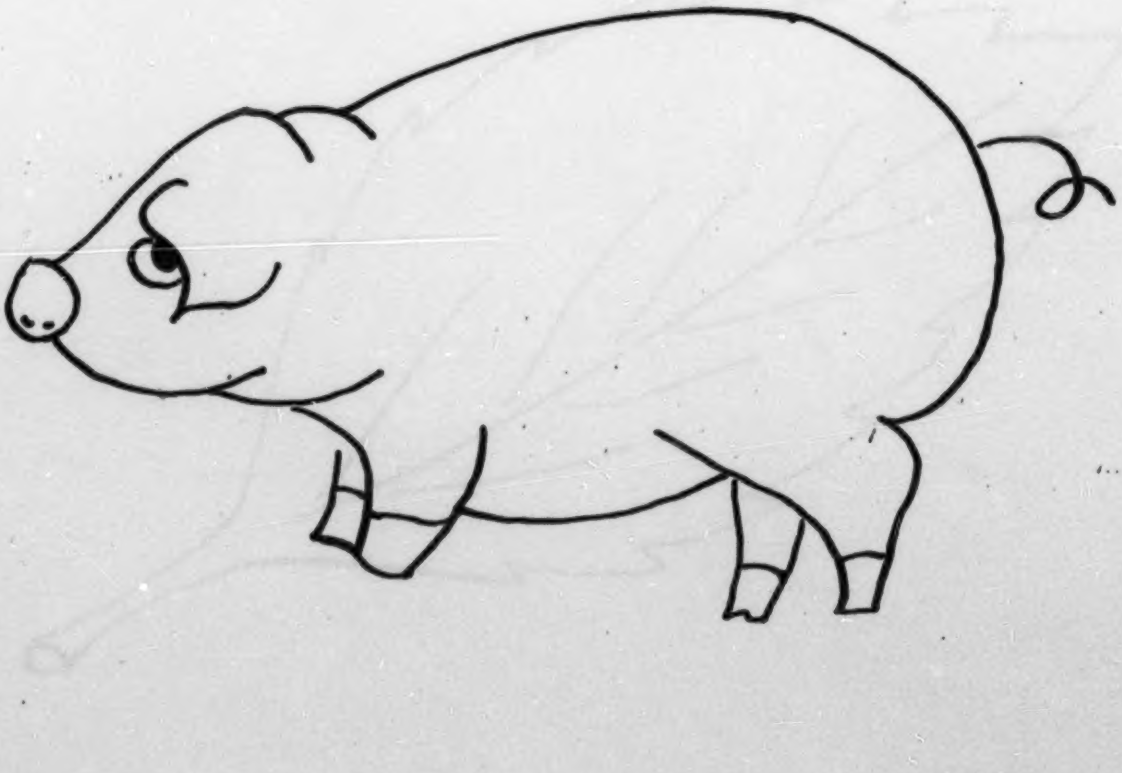
Zip



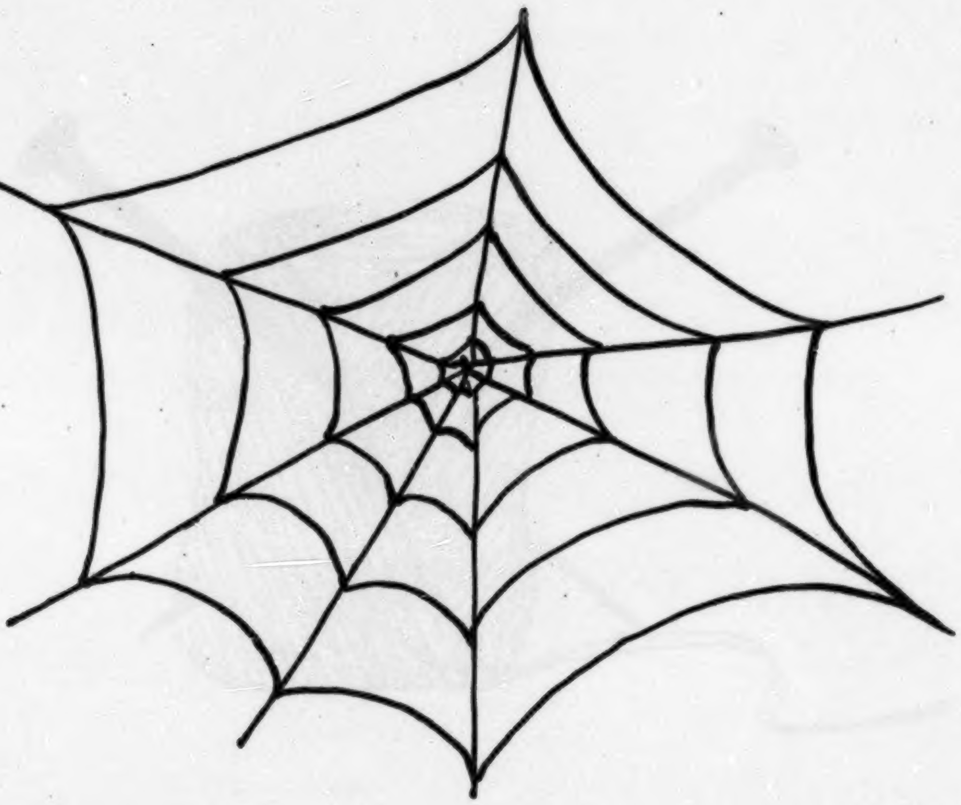
Book



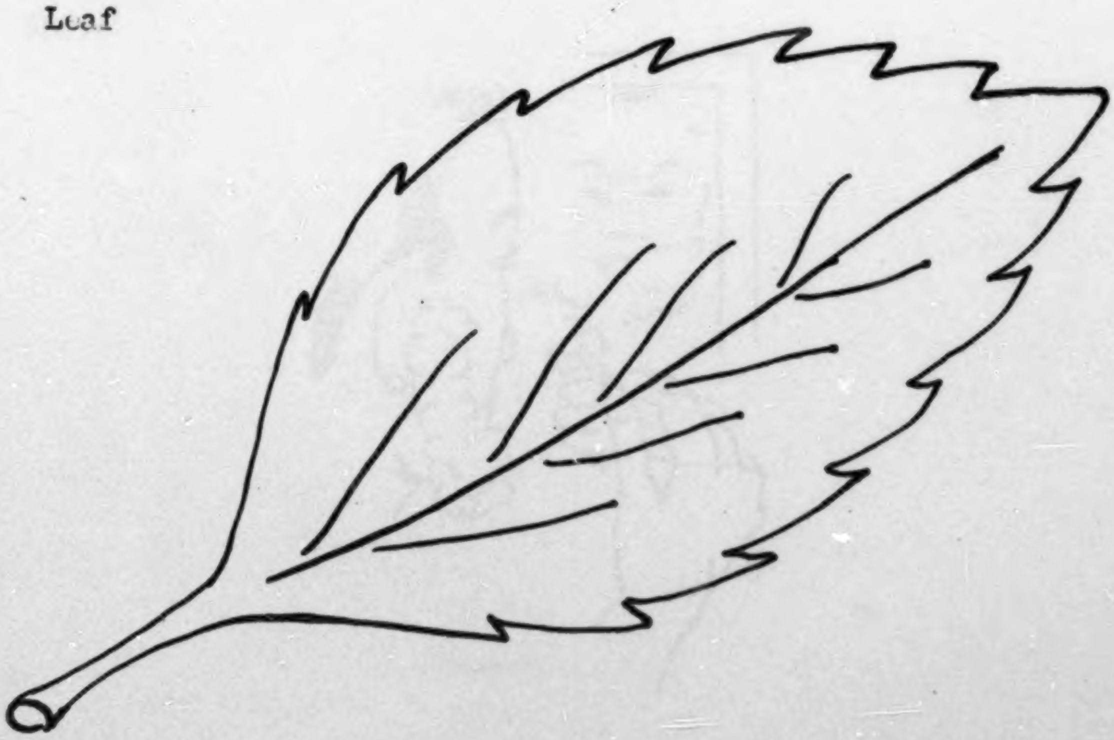
Pig



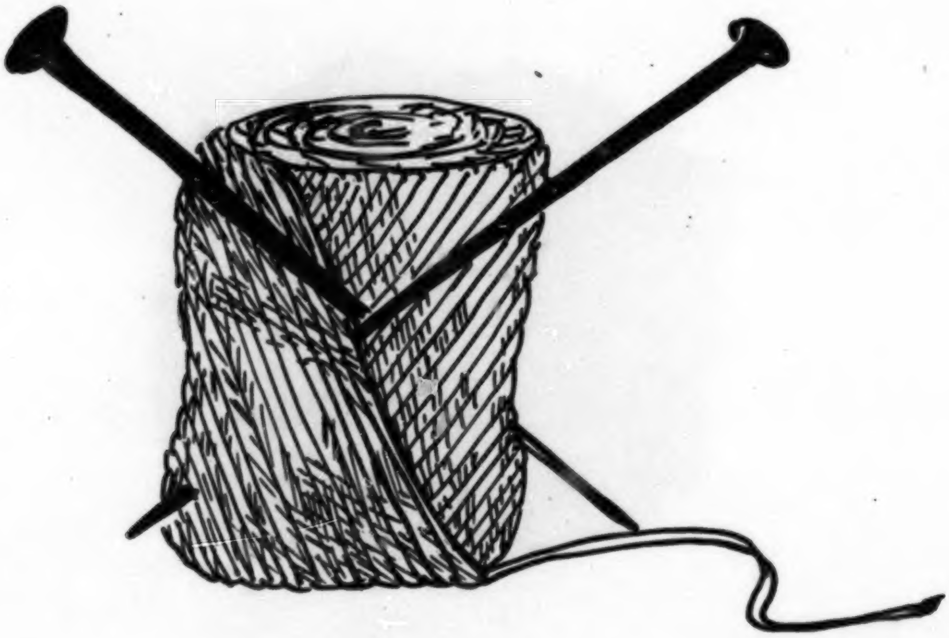
Web



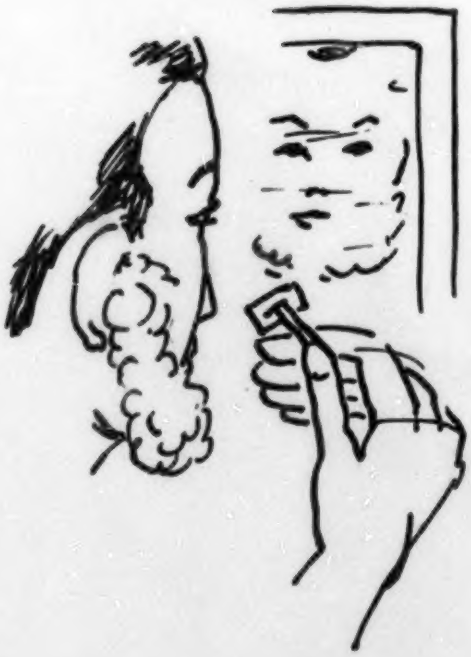
Leaf



Yarn

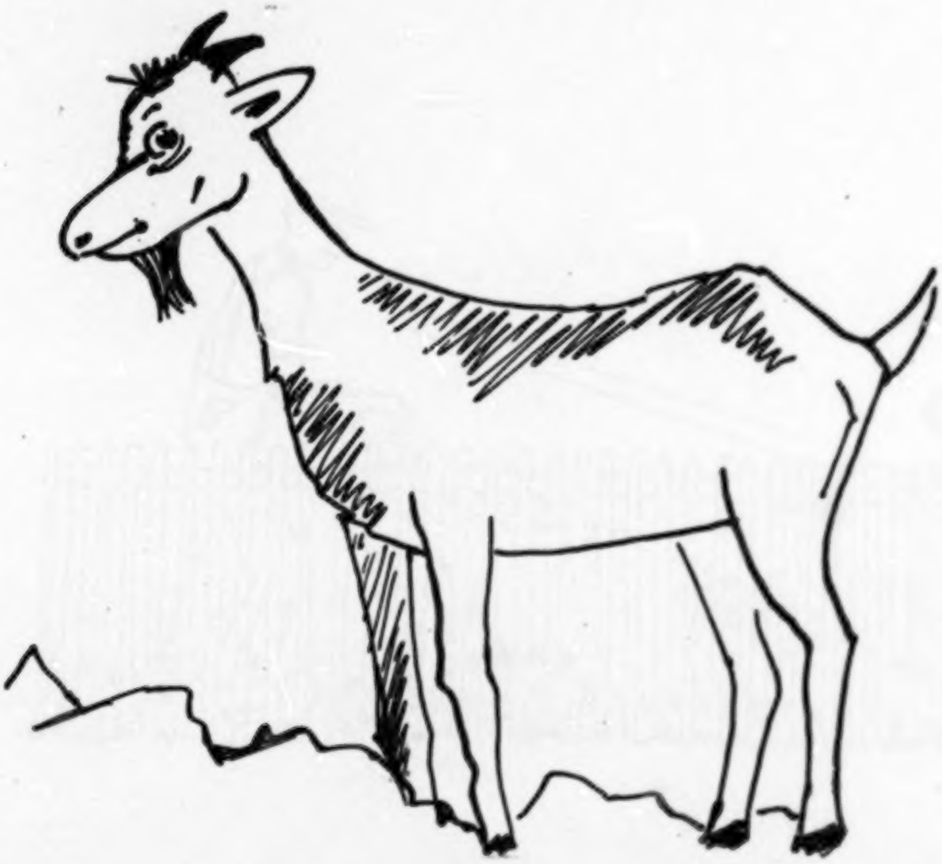


Shave



Smooth

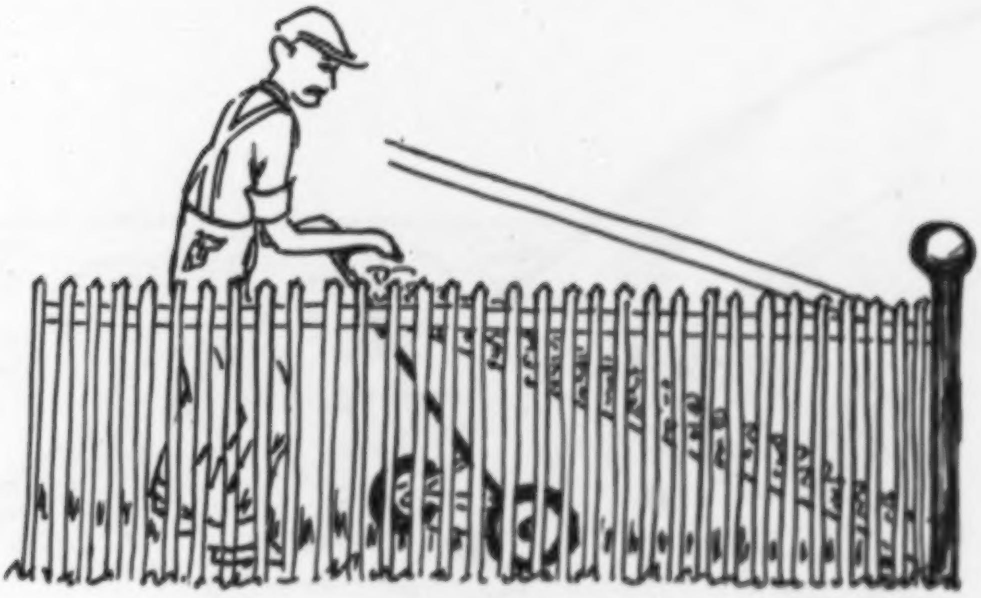
Goat



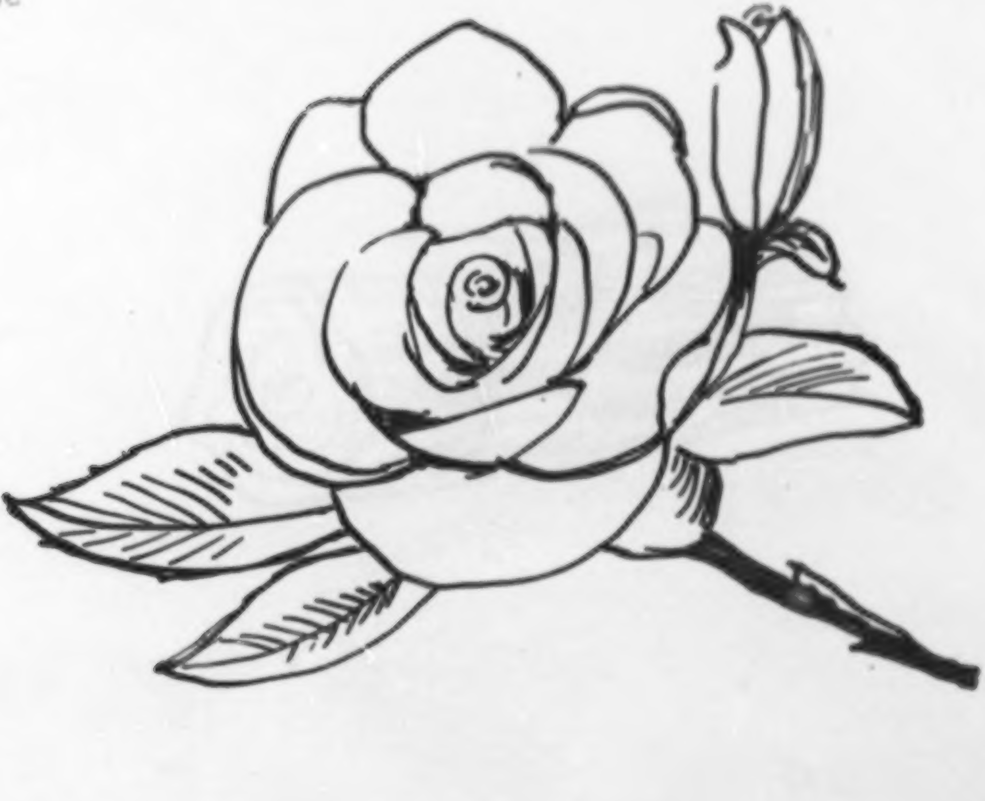
Five

5

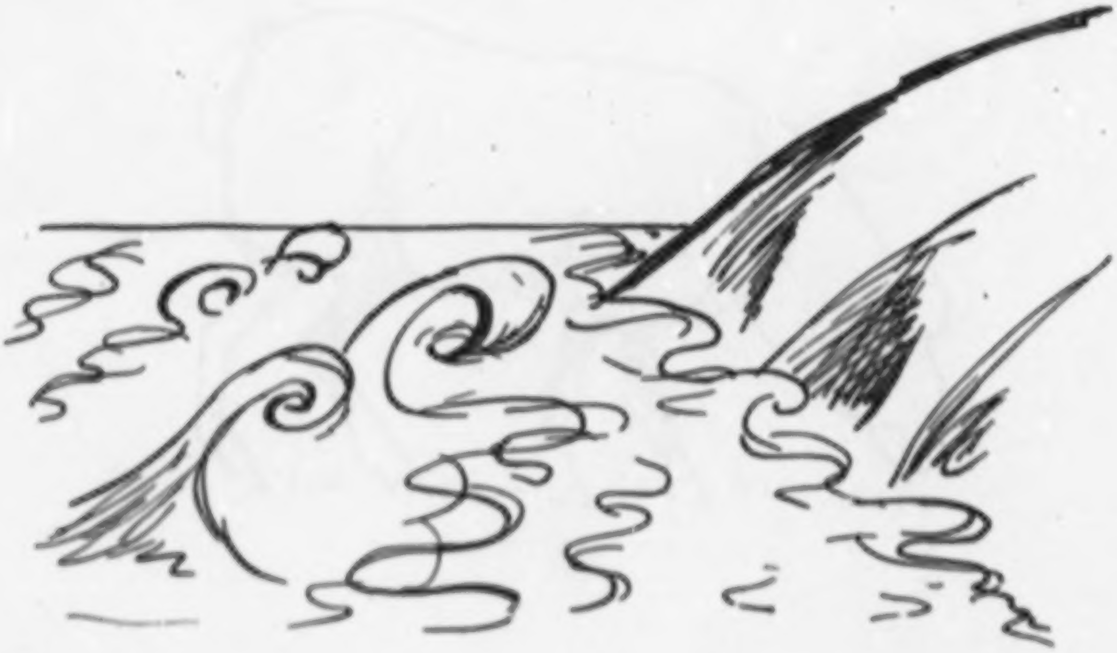
Yard



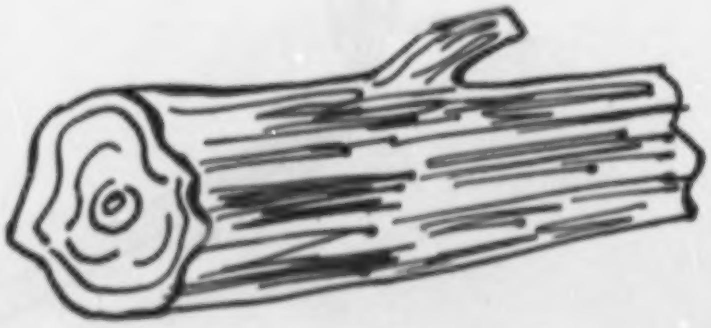
Rose



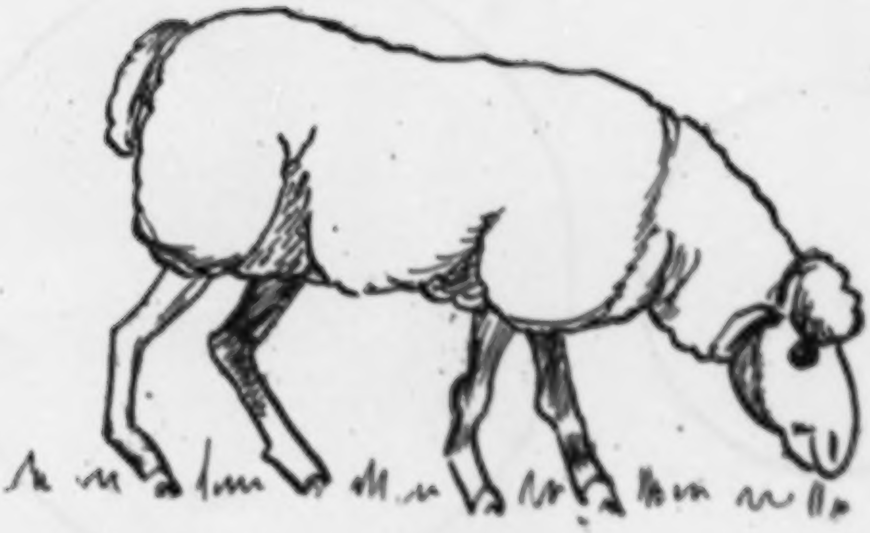
Wave



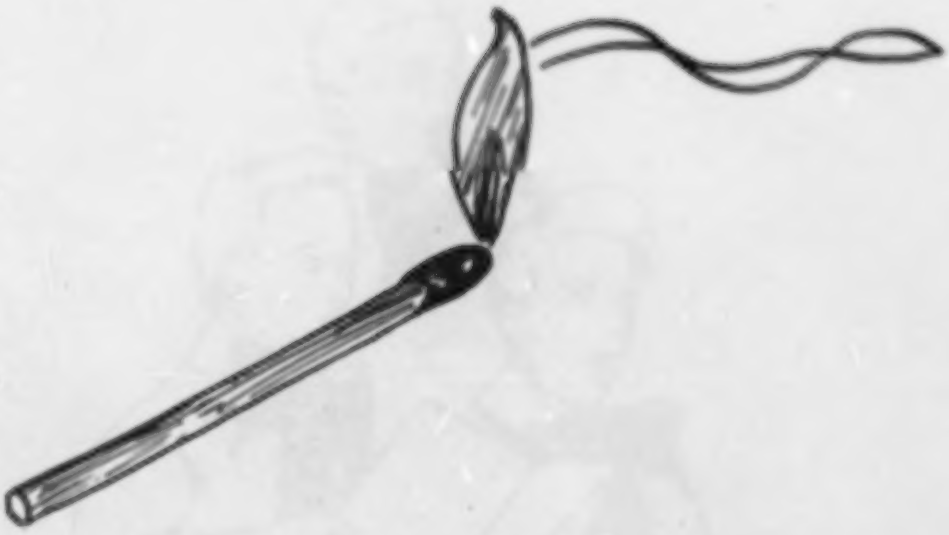
Log

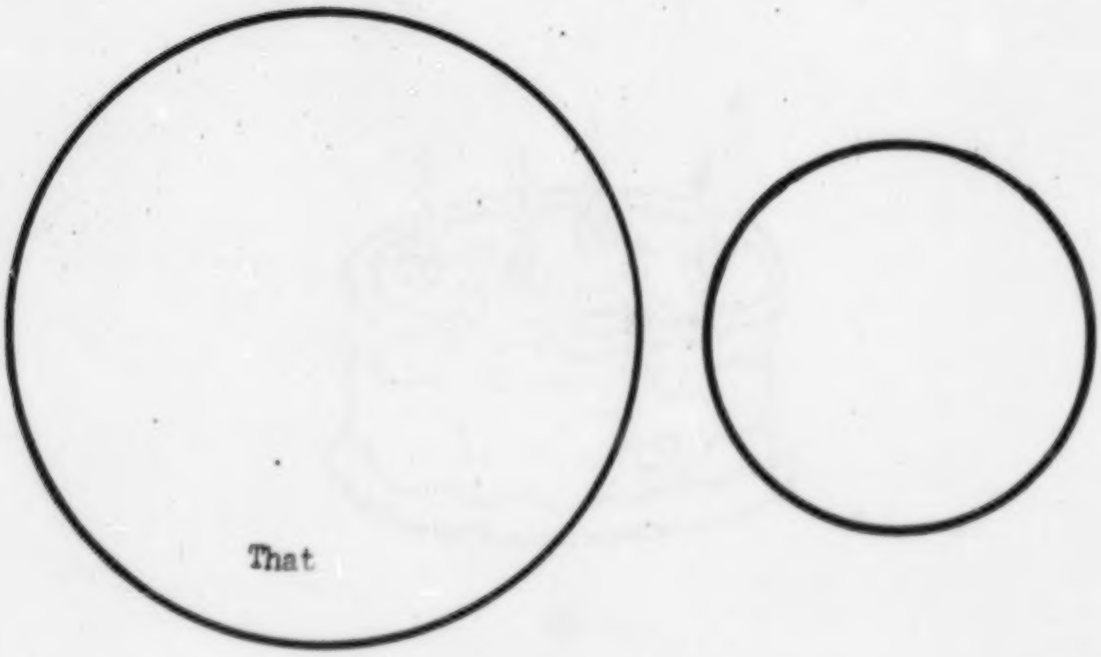


Sheep

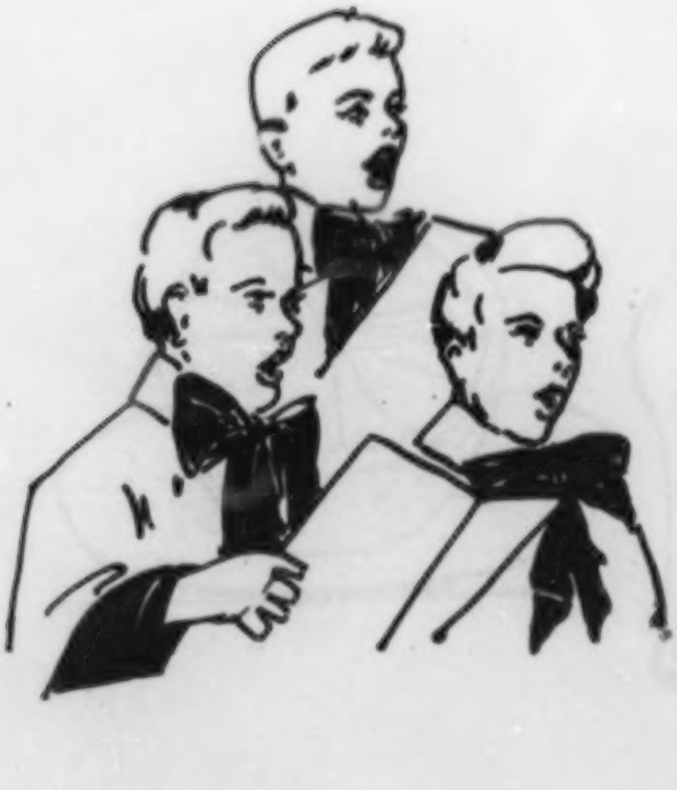


Match

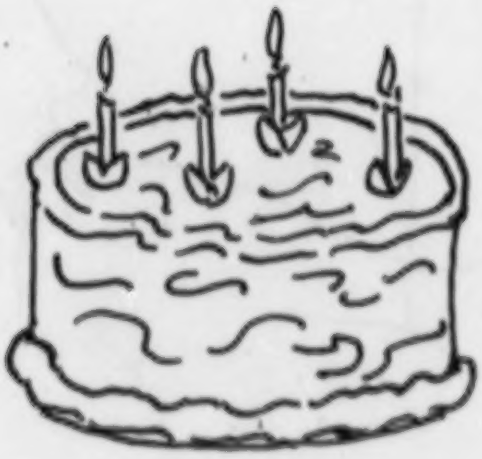




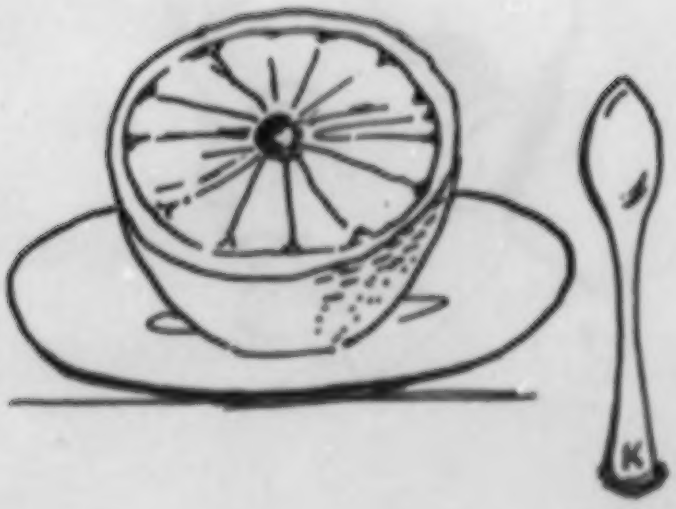
Sing



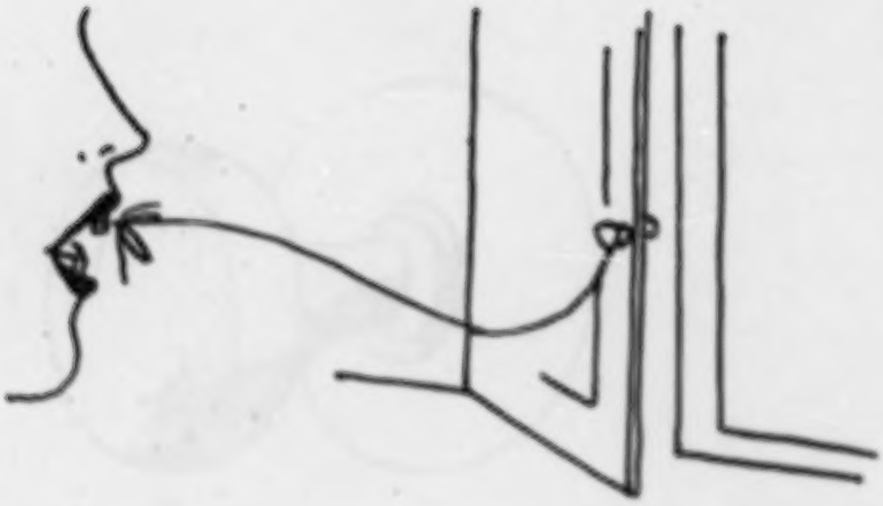
Cake



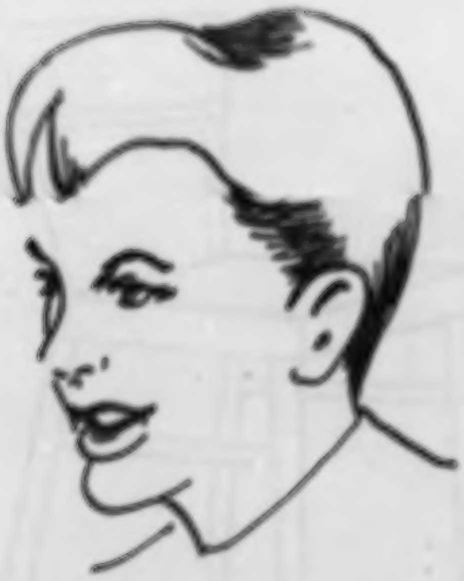
Half



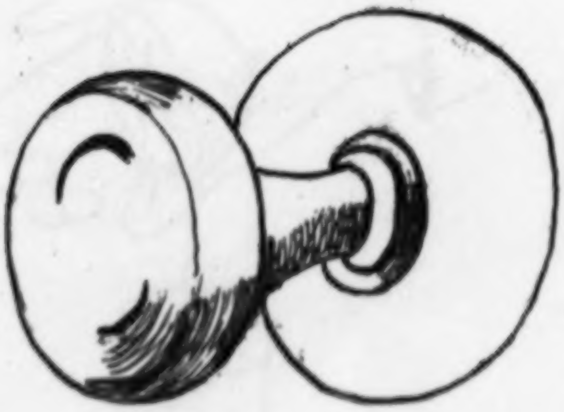
Tooth



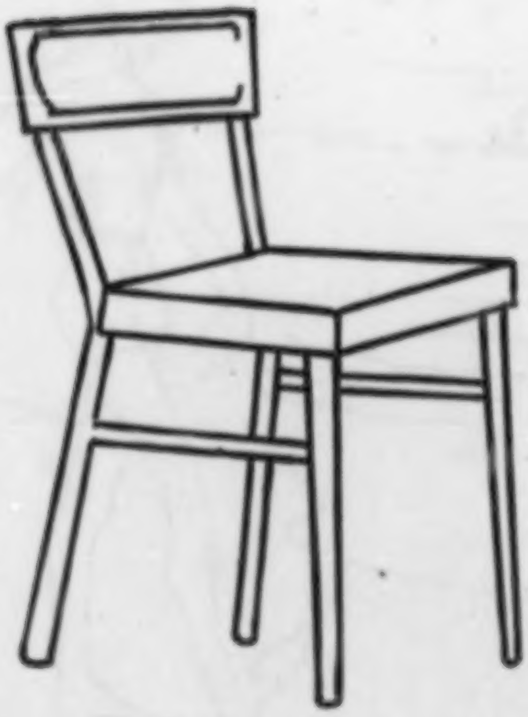
Helen



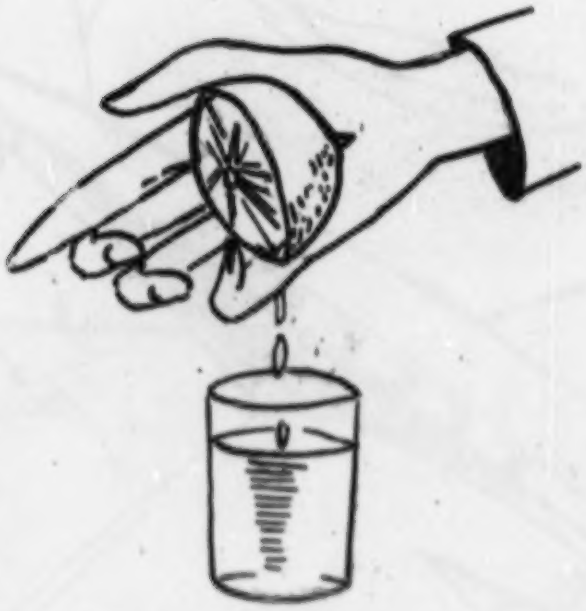
Knob



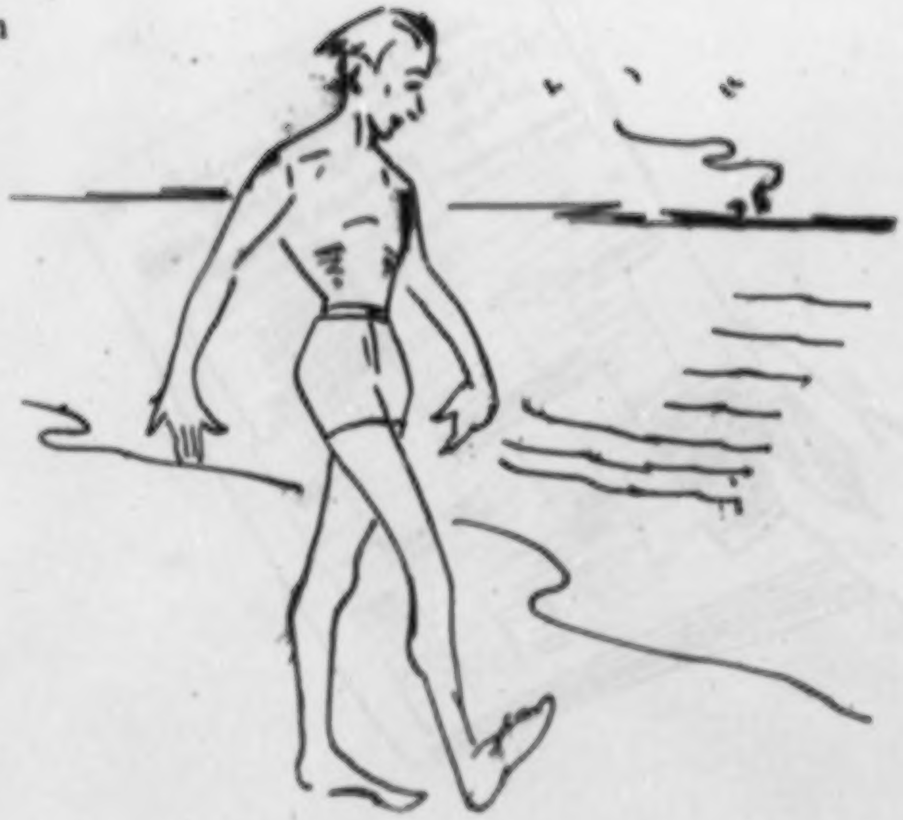
Chair



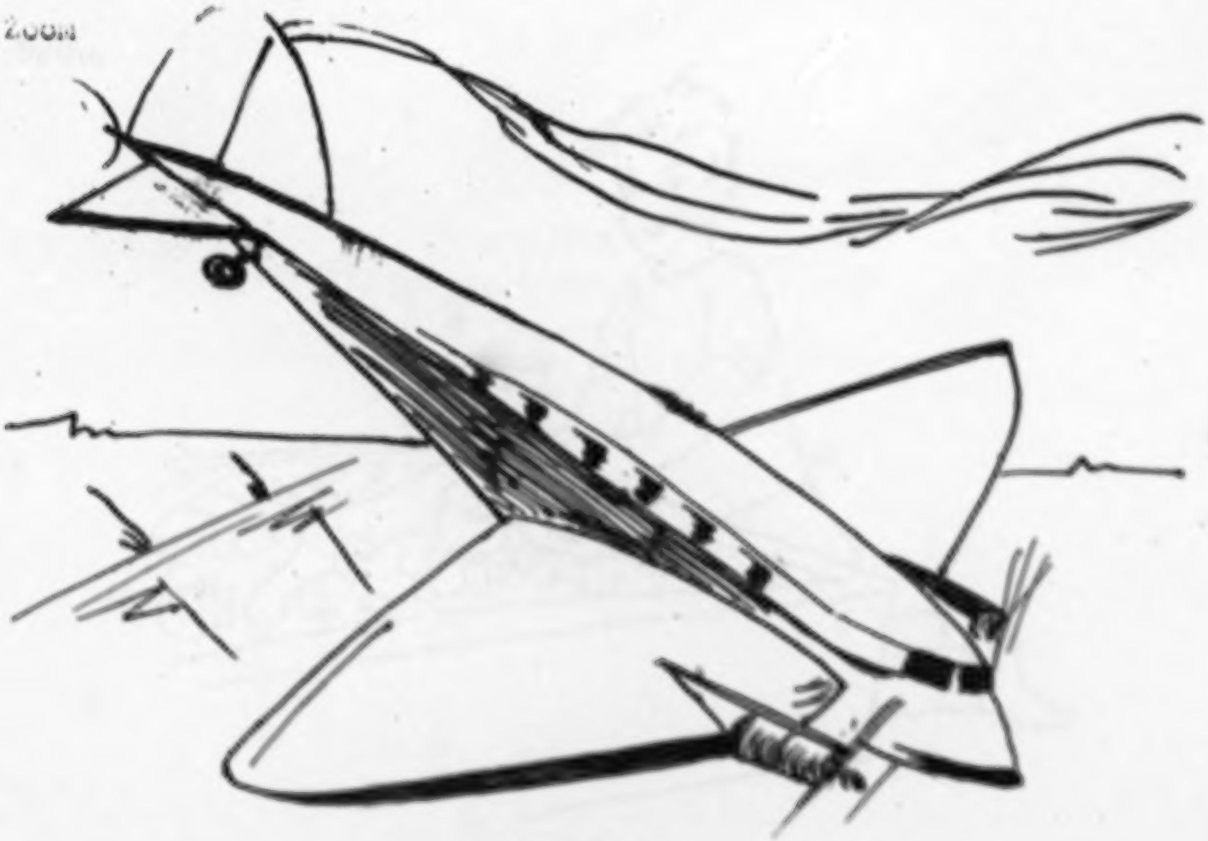
Juice .



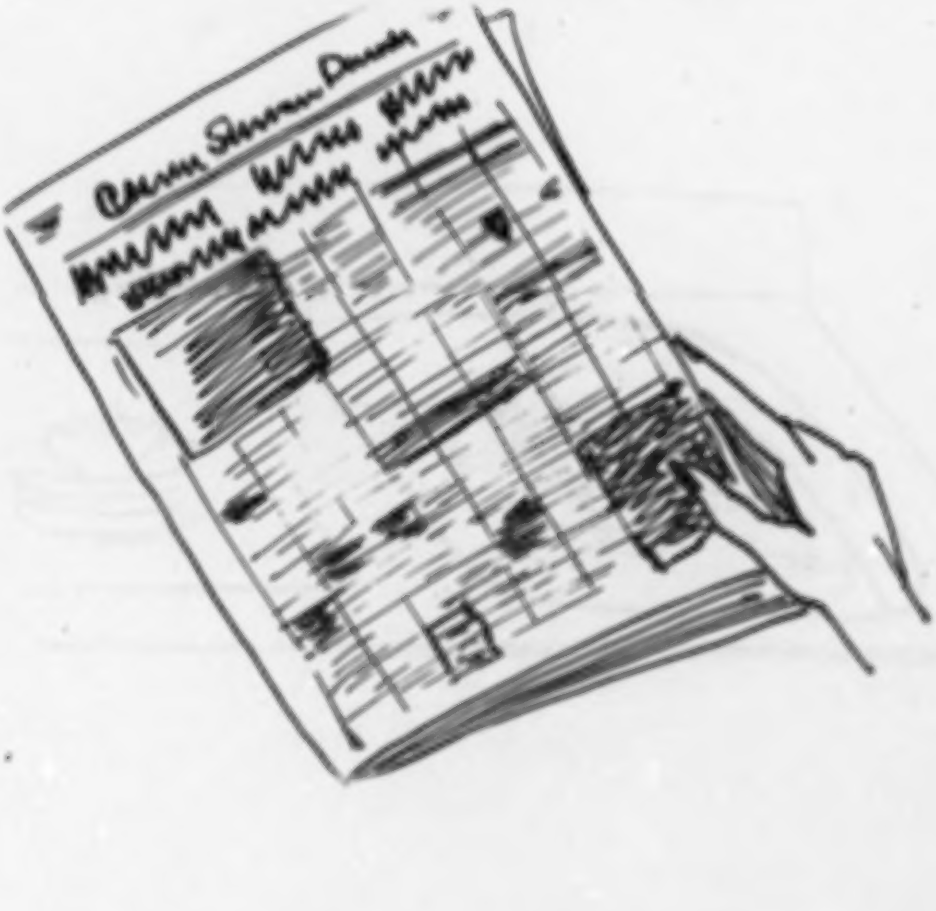
Thin



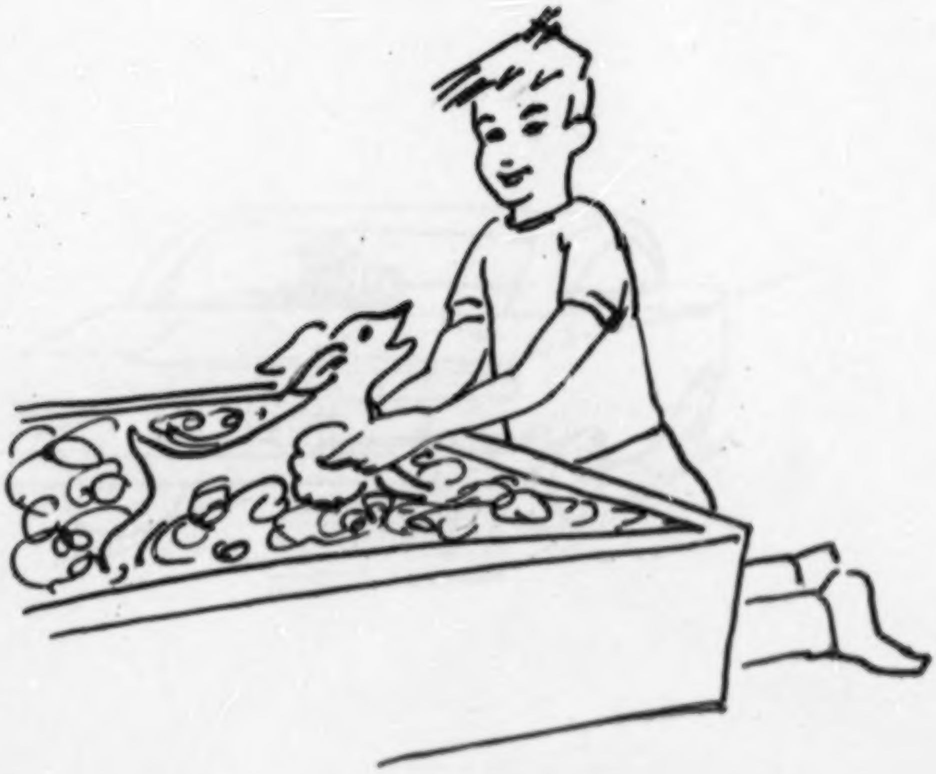
Zoom



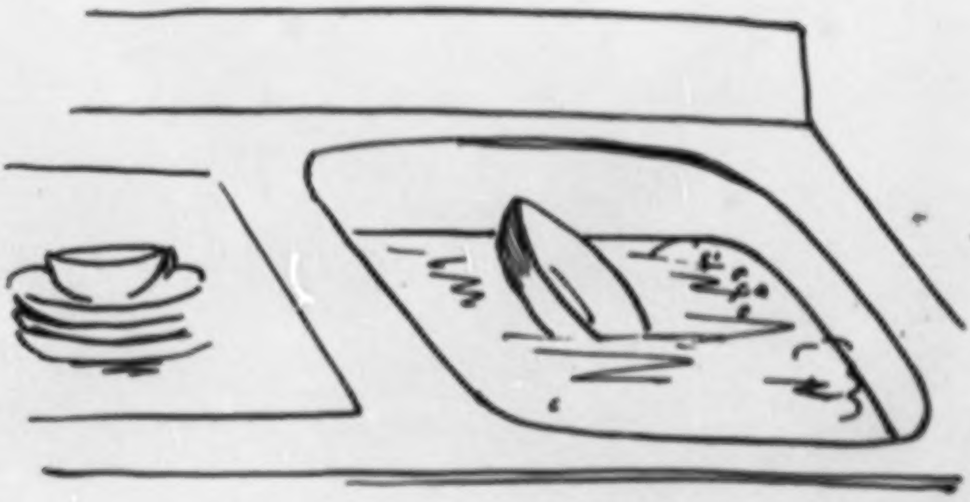
Page



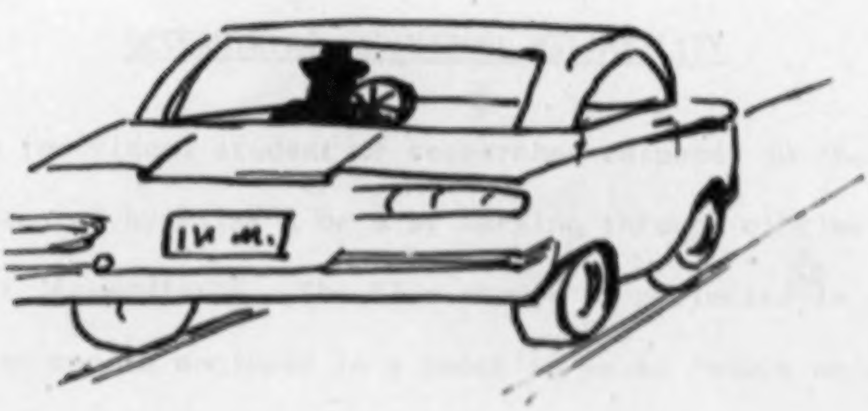
Bathe



Dish



Wheel



APPENDIX F

DETERMINING INDIVIDUAL RELIABILITY

The individual student or researcher responds to the audiovisual stimuli presented by Films A or B by marking through circled items on the answer sheet (Appendix C). The film should be projected in a room where the projector can be enclosed in a booth so as to reduce noise of the machine.

After the test, the student, clinician, or researcher marks his paper according to "right" and "wrong" answers indicated on forms in Appendix D The scoring should be indicated as follows for each of these headings: Isolations, Phrases, "Trios," and Total.

Errors		Not Errors	
Marked	Not Marked	Marked	Not Marked
Total ______	Total ______	Total ______	Total ______

The total number of sounds marked and not marked should be 558.

Percentage of agreement may be figured and compared according to any of the following categories: Isolations, phrases, "trios," and total. The formula by Festinger* may be used.

$$\text{Per Cent of Agreement} = \frac{\text{Sum of agreements} \times 100}{\text{Sum of agreements} + \text{Sum of Disagreements}}$$

---

*L. Festinger, 1944, "Analyses of Methods of Calculating per cent Agreement," unpublished memoranda.

APPENDIX F (continued)

When this calculation has been made, the result should be compared with the percentages made by the 50 experienced clinicians, 50 graduating seniors, and 50 classroom teachers on the table presented below.

PERCENTAGE OF CORRECT RESPONSES MADE BY EXPERIENCED CLINICIANS, SENIOR MAJORS, AND CLASSROOM TEACHERS

	Isolations (276)		Phrases (138)		Trios (144)		Total (558)	
	Film A	Film B	Film A	Film B	Film A	Film B	Film A	Film B
Group I (Experienced)	84.7	83.2	84.0	84.5	79.6	79.0	83.2	82.5
Group II (Senior Majors in Speech and Hearing)	85.8	83.4	85.7	85.8	79.4	79.5	83.9	83.0
Group III (Inexperienced judges classroom teachers)	80.4	79.6	80.0	83.2	73.4	75.8	78.5	79.5

In making a statement about the results, some such comment as the following may be made:

'The investigator or clinician identified 89 per cent of the misarticulations correctly which is better than the percentage of accurate responses made by 50 experienced clinicians."

APPENDIX G

SOUNDS MARKED AS MISARTICULATIONS

TABLE 20

SOUNDS MARKED AS MISARTICULATIONS

A - AUDIO

	Number marked	Number of sounds	% marked	% Correct Responses
		Phrases		
1	1,576	138	22.8	82.6
2	1,610	138	23.3	83.3
3	1,396	138	20.2	81.1
Total	4,582	138	22.1	82.3
		Isolation		
1	4,074	276	29.5	82.0
2	4,013	276	29.1	82.8
3	3,405	276	24.7	79.6
Total	11,492	276	27.8	81.5
		Trios		
1	2,538	144	35.3	77.2
2	2,533	144	35.2	77.9
3	1,991	144	27.7	74.5
Total	7,062	144	32.7	76.5
		ENTIRE TEST		
1	8,188	558	29.3	80.9
2	8,156	558	29.2	81.7
3	6,792	558	24.3	78.6
Total	23,136	558	27.6	80.4

TABLE 21

SOUNDS MARKED AS MISARTICULATIONS

A - AUDIOVISUAL

	Number marked	Number of sounds	% marked	% Correct responses
		Phrases		
1	1,707	138	24.7	84.0
2	1,700	138	24.6	85.7
3	1,735	138	25.1	80.0
Total	5,142	138	24.8	83.2
		Isolation		
1	4,103	276	29.7	84.7
2	4,051	276	29.4	85.3
3	3,988	276	28.9	80.4
Total	12,142	276	29.3	83.5
		Trios		
1	2,692	144	37.4	79.6
2	2,592	144	36.0	79.4
3	2,362	144	32.8	73.4
Total	7,646	144	35.4	77.5
		ENTIRE TEST		
1	8,502	558	30.5	83.2
2	8,343	558	29.9	83.9
3	8,085	558	29.0	78.5
Total	24,930	558	29.8	81.9

TABLE 22

SOUNDS MARKED AS MISARTICULATIONS

B - AUDIOVISUAL

	Number marked	Number of sounds	% marked	% Correct responses
		Phrases		
1	1,779	138	25.8	84.5
2	1,793	138	26.0	85.0
3	1,678	138	24.3	83.2
Total	5,250	138	25.4	73.8
		Isolation		
1	4,179	276	30.3	83.2
2	4,119	276	29.8	83.4
3	3,725	276	27.0	79.6
Total	12,023	276	29.0	82.1
		Trios		
1	2,805	144	39.0	79.0
2	2,739	144	38.0	79.5
3	2,453	144	34.1	75.8
Total	7,997	144	37.0	78.1
		ENTIRE TEST		
1	8,763	558	31.4	82.5
2	8,651	558	31.0	83.0
3	7,856	558	28.2	79.5
Total	25,270	558	30.2	81.6

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